The Chemical Age

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The Fischer Process

PROFESSOR FRANZ FISCHER'S address to the Institute of Fuel on the occasion of his award of the Melchett medal carries one stage farther the impact of chemical industry on the production of fuel. A previous Melchett medallist, Dr. Friedrich Bergius, has described how his experiments upon the synthetic formation of coal, undertaken with the sole intention of obtaining laboratory evidence upon the origin of that substance, had led by laborious stages to the hydrogenation of coal now practised on the commercial scale at Billingham and at certain German works. The stages were partly the resolution of experimental and operative difficulties, but the more troublesome stages of the Bergius process appear to have been connected with its commercial exploitation. Bergius, however, succeeded in making the world believe that every country not possessing reserves of natural petroleum should render itself independent of the importation of oil by producing from coal whatever oil was needed. In this he was assisted materially by the disturbed condition of post-war Europe, but having surmounted this important hurdle, the way has become open for others to produce fuel by chemical methods, without the difficulties in exploitation and finance that beset Dr. Bergius.

There are at present only two processes that will manufacture fuel oil synthetically—the hydrogenation process and the Fischer-Tropsch process. The Fischer (or Fischer-Tropsch) process has been installed at (to our knowledge) two works in Germany, the first of which produced initially some 25,000 tons of oil per year from brown coal and is now being greatly extended, whilst the other had an initial capacity of 30,000 tons of oil annually from coke as raw material. This is a synthetic chemical process operated in Germany by the Ruhr-Chemie, which it may be hoped will be introduced into this country, a fact which would greatly interest the chemical industry. It is understood that an important announcement regarding the future development of the Fischer process will be made shortly.

The Fischer process can take as its starting point any substance from which water-gas can be made. In this country coke would be the natural raw material. There are many ways by which from coke, through the initial stage of water-gas manufacture, a mixture of gases having carbon monoxide and hydrogen in the volume ratio of $CO + 2\,H_2$ can be produced. This gas when purified from contact poisons, chiefly sulphur, is passed over an alkaline iron catalyst at 190 to 200° C. at atmospheric pressure. It is of interest to contrast the analogous process for the production of methyl alcohol synthetically in which, using a zinc-chromium catalyst at high pressure and at temperatures between 300 and 400° C. an identical reaction mixture is converted with high yields into the oxygenated compound $CH_3.OH$. With the iron catalyst (and also with cobalt and nickel catalysts) without pressure, and at much lower temperatures, oxygen is eliminated altogether from the product and we obtain a series of hydrocarbons from the simplest composition ranging up to waxes melting at 120° C. Moreover the product contains olefines which are convertible into lubricating oils, the quality of which, according to Professor Fischer's address, is actually superior to lubricants produced from natural petroleum.

An intriguing suggestion is contained in the closing paragraphs of Professor Fischer's address. Those who visualise the exhaustion of our coal deposits—perhaps no farther ahead than the reign of Queen Elizabeth is behind us—have wondered what is likely to take the place of coal. Professor Fischer gives one answer—an answer that makes the chemical industry responsible for the production of all future fuel supplies: "The carbon dioxide in the air, or issuing from the ground is easily converted into carbon monoxide. . . . The necessary hydrogen can be obtained by electrolysis. . . . It is thus possible to produce any kind of fuel by means of the Fischer-Tropsch synthesis, even if the time should come when coal and oil are no longer available. In the production of fuels and other products from carbon dioxide and hydrogen, we approach again the process employed by nature. . . . We, too, can commence with carbon dioxide and use the energy of the sun, for instance, in the form of water power, which provides in the electrolytic hydrogen the means for the reduction of the carbon dioxide and for the hydrogenation of the carbon monoxide." Unquestionably the cost of fuel by this imitation of nature would be much higher than is the cost to-day, but on the other hand it is not altogether certain that present-day methods of costs and competitive purchasing will then obtain; at all events all nations will be "in the same boat." It is a process of some complexity to recover the 0.04 per cent. of CO_2 from the atmosphere, to release this CO_2 and to convert it into CO. The growth of vegetation may prove a cheaper method of collecting CO_2 from the atmosphere than chemical absorption. It would appear likely that whilst the oils needed for the internal combustion engine might be provided by some such means as Professor Fischer suggests, for our main fuel supplies when coal and oil are exhausted we must look in other directions; the sun's heat, the tides, and perhaps atomic energy.

Notes and Comments

A Need for Better Salesmanship

BRITISH chemical manufacturers are steadily increasing their total production, but they are not maintaining an entirely satisfactory balance of trade with overseas countries. Already this year chemical exports have dropped by £91,050, while imports have increased by more than ten times that figure (£949,510). There are many factors in the international situation to account for this adverse trend, but we are constrained to ask whether the industry is doing all that it might in the matter of salesmanship. From time to time we are reminded by trade experts in overseas countries of the need for a better understanding of local circumstances, a more intimate knowledge of the native language, and periodical contact between the executives at home and the salesmen and their customers on the spot. Even in the home market there is need for keener selling methods to combat the rise in imports, but entirely different circumstances prevail in the overseas market. The industry might well consider the practicability of establishing salesmen's circles in which the innumerable problems of persuading home and foreign users of chemicals to buy the goods which British manufacturers have to offer might be systematically examined.

Contamination and Decontamination

WE can forsee the day when first editions of the literature which is now being issued by the Air Raid Precautions Department of the Home Office will be eagerly sought after by collectors and ultimately find its place in the secondhand booksellers' catalogues as "Curiosa." These handbooks and memoranda are —and will remain—one of the best examples of literary efforts put out by a Government Department at the expense of the taxpayer. Moreover, if the price of the recommended decontaminating materials—bleaching powder, paraffin, petrol and vaseline—does not soar in anticipation of future demand (per instructions as set out in Handbook No. 4) it will be due only to the fact that would-be profiteers in the chemical industry realise a good joke when they see one, or to the fact that they find themselves forestalled on reading that "the Government will arrange for the accumulation of supplies of bleaching powder." As individuals we will eventually lose all our individuality. The decontaminating squad will divest us of our clothing, wash us, besmear us with bleach ointment, and—presumably —complete their duties in the rôle of an efficient Nanny by putting us to bed (if necessary) or by dressing us in clean clothes that we may enjoy some more of the delights of coming into contact with poisonous and blistering gases. Other decontaminating squads with strip the wallpaper from our houses, tear up and burn the poison-soaked floorboards, consign our damaged upholstery to the flames of an official destructor, hose down our motor cars, and clean up the streets—all in true agreement with the procedure given in great detail in these handbooks. Nothing has been overlooked—but to what purpose? We are even told that the foreman of a decontaminating squad should "wear a distinctive mark, *e.g.*, a piece of coloured material tied round the neck," and that he must decide "which method of treatment is most suitable and convenient," but "in cases of special difficulty or doubt he should obtain advice from his superior officer." A great experiment it will be—with great loss of life—on the basis of laboratory experiments and theory!

The "Good" Old Days

CONDITIONS in the chemical industry to-day are not what they were 43 years ago. In 1893 the average weekly hours of men employed by the United Alkali Co. (now part of Imperial Chemical Industries) at Widnes ranged from 75 to 81. The regulation week-day shift was twelve hours for the majority of the process men. No meal time was allowed; the men had to take their food as they could in snatches. So many conflicting statements were being made about that time concerning the injurious effect of their occupation upon chemical workers that a special commissioner, sent to Widnes by a London newspaper no longer in existence, to investigate the situation, collected a mass of information from doctors and workhouse officials which convinced him that the work upon which the men were engaged was peculiarly healthy. In reprinting the full report of the commissioner to emphasise the remarkable contrast between conditions then and now, the "Widnes Weekly News" recalls that at that time Mr. Gladstone was in office for the fourth time as Prime Minister and Mr. H. H. Asquith was winning his spurs as Home Secretary (the first office he held in the State). One of Mr. Asquith's first acts was to schedule the chemical trades under Clause 8 of the Factory Act, thus making possible the announcement of safeguards to protect the lives of thousands of chemical workers on Merseyside and elsewhere.

Chemical Sythesis from Natural Gas

ALCOHOL is a prolific starting point for a vast field of organic synthesis, and many attempts, frequently on the industrial scale, have been made to turn the simpler forms of organic matter into alcohols. The latest of these is the conversion of natural gas in America, by way of oxidation under pressure, into methyl alcohol. Whilst a proportion of natural gas is burnt for fuel, a still larger amount is wasted and there are petroleum technologists who believe that chemical utilisation of the gas is the most promising outlet. On behalf of the Research Council of Alberta, an apparatus and technique have been evolved by which air and natural gas mixtures are allowed to react in the presence of a copper catalyst at pressures from 2,000 to 3,000 lb. per sq. in. at temperatures from 375° C. to over 500° C. and at various rates of flow. Conversions of gas burnt to methyl alcohol of 74 per cent. are readily obtained at low oxygen concentrations, together with a little formic acid and formaldehyde. Up to the present a copper catalyst is the best discovered. In general it has been found that there is an optimum temperature for optimum yield with any one mixture of air-gas, the temperature being higher the lower the oxygen content. Higher oxygen content leads to decreased yield. The effect of pressure is similar to that of temperature, maximum yields being obtained at intermediate pressures of the order of 2,500 to 3,000 lb. per sq. in.

Control of Chemical Processes

The Installation Factor

MR. DOUGLAS W. HARRISON, of Negretti and Zambra, presented a paper on "The Installation Factor in Automatic Controls" at the conference on automatic regulation arranged by the Chemical Engineering Group at University College, London, on October 15. Professor H. E. Watson presided.

Although excellent results are being obtained in many automatic control installations at the present time, it is certain that some are not working to the highest degree of efficiency of which they are capable, said Mr. Harrison. It is the general experience of those who are called upon to "service" automatic controls that the troubles due to errors in their installation or fitting probably exceed those due to bad design or the wrong choice of type for the particular purpose in view. It therefore seems appropriate that consideration should be given to some of the matters which affect results, and the pitfalls which may beset those responsible for installing or supervising the installation of automatic controls.

Of the various functions in industry which are automatically controlled, those of temperature, humidity and pressure are the most common, and consideration will be confined to them. Three illustrations are given for general types of installation. Fig. 1 shows one of the instrument boards in an installation of automatic humidity and temperature controls in a colour printing works. Fig. 2 shows recording type temperature controls on chemical drying ovens. Fig. 3 illustrates the instrument board of an installation of electrical type process controls with recording and alarm features in a brick works.

The factors which apart from the design of the control apparatus have a bearing on the successful working of any automatic control installation may be classified conveniently as follows: (1) Local conditions surrounding the instruments themselves. (2) Plant characteristics. (3) The sensitive element, or, in the case of pressure controls, the pressure connection; its type, location and protection. (4) The effect of the quality of the installation work in general.

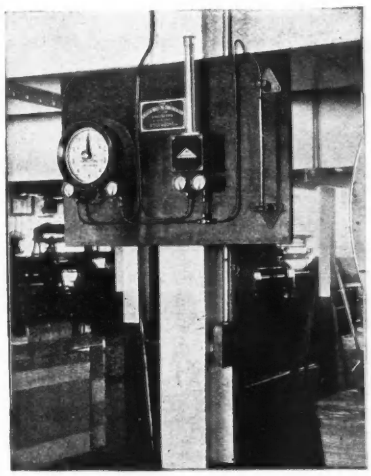


Fig. 1.—Instrument board for air-conditioning controls at colour printing works.

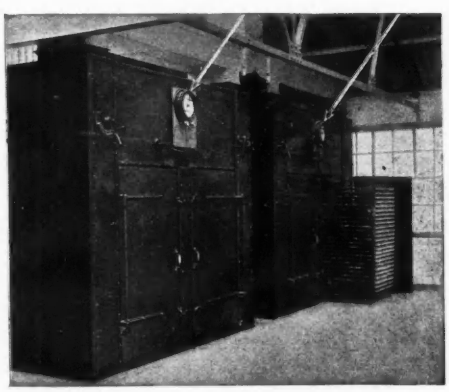


Fig. 2.—Recording controller on chemical drying ovens.

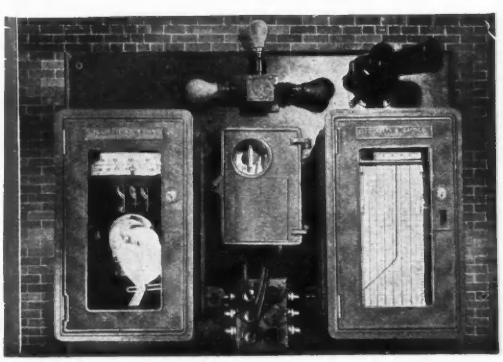


Fig. 3.—Instrument board for controls, recording and alarms at brick works.

The average instrument maker does not expect his products to be housed under museum conditions, but he does not agree with the "treat 'em rough" policy, which is said to be so beneficial in other spheres. His problem is, in some respects, an economic one; unless he is making an instrument for one particular application, he hopes that his product will find its way into many different kinds of works and factories involving a great variety of conditions. He accordingly proceeds to visualise every conceivable adverse condition, such as corrosive fumes, dust, dripping oil and water, escaping steam, vibration and every extreme of weather condition. When a control installation is to be installed, therefore, it is evident that it is worth a little thought to find a clean and accessible spot in which to mount the "brains" of the apparatus.

If, as is often the case in chemical plants, there is likely to be corrosion or other enemy to contend with, great mutual advantage will be secured if the user will let the instrument maker have the fullest details and any suggestions which experience has shown to be good, especially with regard to materials or finishes which have been found successfully to withstand the conditions. If the instruments embody open electrical contacts of any type it is vital that there shall be no risk of contamination of the contact surfaces with consequent unreliability of operation.

Controls operated by compressed air are invariably designed so that the operating air is exhausted into the case of the instrument after it has done its useful work. An advantage of this is that there is a flow of air from inside the case to the outside, thus reducing considerably the ingress of the contaminating atmosphere. It will be clear, however, that the compressed air itself must be as clean as possible, and to this end the compressor intakes must be arranged to take in air as cool, clean and dry as possible. The delivered air must pass into a water trap which must be at the coolest part of the system in order that it shall collect water and oil from the air with maximum efficiency. This trap should also preferably be situated at the lowest point of the piping layout.

Dust, grit, or scale from the inside of air pipe-lines or drawn in at the compressor intake are probably the most common cause of unreliability in air-operated controls, so it will be obvious that adequate filtering is essential. In practice it is found desirable to have filters at various points in the system rather than to rely on one main filter at, say, the main air delivery pipe.

Plant characteristics are an important factor in the success or otherwise of an installation of automatic controls. Regarding the supply and demand of the controlled medium, it is sometimes overlooked that it is almost as detrimental to

results to have too great a supply as it is to have too little. In the case of temperature controls for example, and more particularly in the case of the on/off type, if the rate of heat input during the "on" period is very much in excess

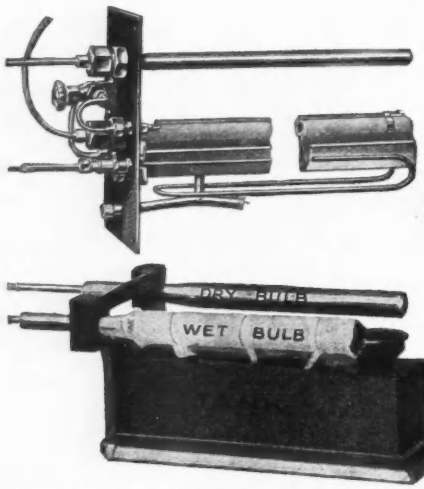


Fig. 4.—Wet and dry bulb arrangements for humidity controls.

of requirements, "overshooting" or "hunting" is bound to result. It is therefore essential to consider very carefully the size of the component which is responsible for the actual regulation.

When heating by steam, gas, water or oil, or cooling by brine or other means, the control valve is the component to consider. With suitable charts or tables it is not difficult to find the smallest valve which will deal with the maximum demand, yet frequently valves are installed which are too large for their work; they give inferior control and are higher than necessary in first cost.

With electric heating the number of heating elements which are controlled may be well in excess of requirements, thus calling for unnecessarily large contactor gear.

Fig. 5.—Sensitive element for frequent removal.

With humidity control by means of sprays of steam or water, the humidifying effect, when the sprays are started up by the controller, may be sometimes so great that although they are stopped again automatically almost immediately, the excess of moisture to be dissipated causes a coarse control. All troubles of this kind can be due to a little misunderstanding.

It is hardly an exaggeration to state that, from a control point of view, there cannot be too much circulation of the

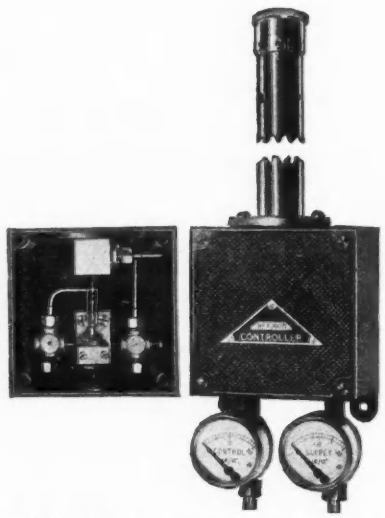


Fig. 6.—Hygroscopic type humidity controller with forced circulation.

material being controlled. Ovens are among the worst offenders in this respect, and without air circulation, the differences of temperature which can be obtained at different parts of the oven at any given moment are truly amazing. It is often not commercially possible to obtain a very high degree of uniformity of conditions, but this fact is no excuse for not trying. In the case of humidity controls of the wet and dry bulb type, the air movement over the wet bulb should be at least 15 ft. per sec., otherwise an actual error of measurement may occur.

In the same category as circulation may be placed lag of the thermal, mechanical or any other type. The circulation may be perfect and yet the results be inferior because, for instance, the thermal capacity of the plant is excessive. It may be that a vessel, the temperature of the contents of which is being controlled, must be made of a material which is a poor heat conductor and yet be heated from the outside. The effect in these cases, with normal types of control, is for the heat input to be maintained for far too long a period, and when the controller does eventually decide that the con-

Fig. 7. Diaphragm operated control valve.

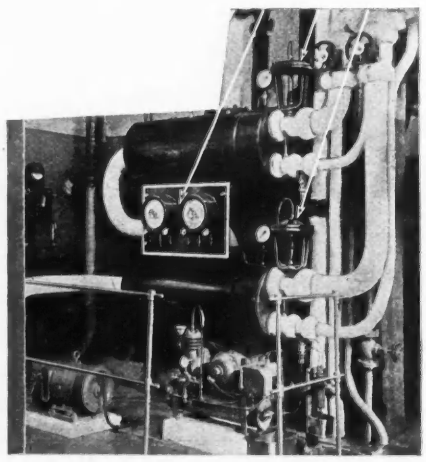


Fig. 8.—Air-operated calorifier controls. An example of accessible installation.

tents of the vessel are hot enough, and therefore shuts off the heat, the B.Th.U. stored up in the vessel causes the temperature to continue to rise, and, of course, the reverse happens in cooling.

Variable conditions of a plant should be carefully taken into consideration before installing automatic control equipment. It is rightly claimed that these variable conditions are simply the reason for the controls. Take steam pressure as an example. If the approximate required number of pounds per hour of steam, together with the lowest and highest steam pressures, were given to the controller supplier, it is reasonable to suppose that he has suggested the correct size of control valve. If the heat requirements or pressure limits are greatly exceeded for any length of time no blame can attach to the control system for failure to maintain a constant condition.

With the simpler and more common types of gradual action or throttling controllers it is an inherent characteristic that a change of position of the regulating means is accompanied by a proportional change in the actual control point. In some installations where excessive plant lag or poor circulation exists, the controller is adjusted to have what is known as its "throttling differential" at a fairly high value in an attempt to obviate "hunting," provided the controller is designed to be adjustable in this respect.

The Sensitive Element

The type, location and protection of the sensitive element in temperature and humidity controls and the details of the pressure connection in pressure controls can and do contribute greatly to the success or otherwise of an installation. In the case of temperature controls it is the bulb, phial, thermocouple, resistance element or bimetallic arrangement which, together with some mechanical feature in the instrument, constitutes the primary measuring element of the conditions under control.

Whilst considering the best type of sensitive element it is also necessary to consider carefully its location. Although the element must, as far as possible, be affected by the general temperature of the material under control, it is found in practice that a location not far from the source of heating or cooling gives the best results. The reason for this is simply that the effective plant lag is thereby reduced.

Special cases arise in connection with location. The case of insertion in pipe-lines is one about which there is a right and a wrong way. If the pipe is small it is rarely possible to arrange for the element to be across the flow without some of the element being in an area of camparative stagnation. The most frequent solution is to insert the element in a bend or elbow so that the length of the element lies collateral with the direction of flow. The great advantage of this method is that a satisfactory length of neck or insensitive portion can be provided so that heat conduction from the element is reduced.

Protection Against Damage

If protection against corrosion only is required the choice of suitable materials is the only consideration, and in this the user must be ready always to advise the maker of the controls, because invariably the user has already been obliged to look into the question of materials in considering the plant in general. Where mechanical protection is necessary, the important point is to ensure that the guard is adequate without affecting the circulation past the element.

Separable pockets or sheaths should be avoided if possible, but, where essential, they must be a close slide fit on the element, or, if this cannot be arranged, the clearance must be filled with a material of good heat conducting qualities. In those cases in which it is necessary to remove the sensitive element at frequent intervals for cleaning or sterilising purposes, one of the special designs for this purpose should be used, otherwise continual breakages will occur. Such a fitting is illustrated in Fig. 5.

With humidity controls some special factors have to be considered. For example, with wet and dry bulb controls the fact that moisture is present at one bulb may induce corrosion which would not have occurred with the bulb in a dry state. Lead covering for wet bulbs should be avoided because of the action of the distilled or soft water used for irrigating the bulbs. Tin or stainless steel are found satisfactory. Fig. 4 shows two arrangements of sensitive elements for humidity control by the wet and dry bulb method, (*a*) for use in ducts with steam condensate feed for wick irrigation; (*b*) for rooms, etc., with tank feed.

Dust given off in some processes can be a source of trouble, and the most satisfactory construction of these instruments is that in which the element is totally enclosed and forced circulation through the instrument of the air being controlled takes place. Screens for eliminating dust can then be introduced without risk of increasing the lag of the instrument. A design of this type is illustrated in Fig. 6, the intake holes for the air being controlled being at the top.

Quality of Installation Work

Given the best controller for the job and intelligent direction as to its installation, there is still the work of the mechanic or fitter to be taken into account. With most control equipments instruction sheets are sent regarding installation and maintenance.

Firstly, care must be taken that these instructions actually get into the hands of the fitter, and, secondly, that he is both capable of understanding them and willing to do so. It is naturally assumed that the instructions are capable of being understood. Most instrument makers realise the value of such instructions in promoting a feeling of confidence and also in saving actual time and money in correspondence and service work.

One of the most important jobs that falls to the lot of the fitter is the fitting of the control valve or damper gear. A typical diaphragm-operated control valve is shown in Fig. 7.

Good installation is not only a question of obtaining a good outward appearance. One of the hidden qualities of a really good job is the degree of forethought which has been shown in regard to accessibility. A unit which clearly must have periodical attention, however infrequently, should not be so situated that scaffolding is required to get at it. Neither should a unit which may, at some time, require removal be so placed that this is only possible after dismantling half the plant. An example of accessible installation is given in Fig. 8 which shows calorifier controls.

Industrial Toxicology

A Forthcoming Lecture

THE first evening meeting of the Pharmaceutical Society for 1936-37 will be held in the Society's house on Tuesday, November 10, at 8.30 p.m., when a lecture on "Industrial Toxicology of To-day" will be given by Dr. Donald Hunter.

Knowledge of industrial toxicology began very early in the history of civilisation, when studies were made of the ill-effects of metallic poisons. In contrast, substances which were little more than chemical curiosities twenty years ago have now found extensive use in modern industry. They include coal tar derivatives, chlorinated hydrocarbons, and ketones. Some of them are harmless, others so deadly that they would be better forbidden. Some are absorbed by inhalation, others through the skin. Some attack the liver causing toxic jaundice, others the kidneys causing suppression of urine. Some affect the blood causing cyanosis, others destroy the bone marrow causing hæmorrhagic purpura and aplastic anæmia. The methods in use to protect the worker in industry therefore assume great interest and importance.

UNITED STATES imports for consumption of coal tar dyes totalled 1,502,193 lb. ($2,156,483) in the first six months of 1936 compared with 1,810,935 lb. ($2,630,067) in the corresponding period of 1935.

Twenty-one Years' Progress in Coke Making

Annual Meeting of the Coke Oven Managers' Association

THE twenty-first annual meeting of the Coke Oven Managers' Association was held at the Hotel Victoria, London, on October 22, and the annual dinner was held the same evening under the chairmanship of the newly-elected president, Mr. T. Johnson, manager of the new Cleveland coke oven plant of Dorman, Long and Co., Ltd.

Mr. JOHNSON, in his presidential address, said more progress in the art of coke making had been made during the last twenty-one years than in all the previous years put together. When one considered the conditions obtaining twenty-one years ago, and compared them with the position to-day, one was almost staggered at the progress made and wondered what their successors would be doing twenty-one years hence. Valuable work had been done by the coke research committees in recent years on the effect of crushing, blending and temperature upon the quality of coke produced, and the practice of mixing back finely crushed coke breeze with the coal blend where practicable, had been a real step forward.

With regard to the progress in modern coking practice generally in this country during the last twenty-one years and the effect of oven design upon the quantity and quality of by-products produced, great credit was due to one of the Association's early presidents, Mr. Middleton, of Consett, a real pioneer in the art of coke making. While others were hesitating and indeed afraid of moving forward, he not only advocated silica construction but built his own silica brickworks, quarried his own silica rock and produced the bricks with which to build the first large silica battery in this country. Great doubt as to the advisability of this venture was expressed by many at the time, but to-day, silica construction had become the order of the day and the advantages were no longer disputed.

Improvements in Working Conditions

The tonnage of coal carbonised per man shift to-day was about ten times what it was twenty-one years ago, whilst working conditions, about modern plants, were greatly improved, and the percentage of surplus gas available for steel smelting or town use had gone up appreciably. Mr. Middleton's researches at Langley Park in 1917 added greatly to their knowledge of the effect of oven top temperature upon quality and quantity of by-products produced. Prior to that date, little was known as to the cracking which took place in the gases evolved from coal charge, in their passage to the ascension pipe, and it was the presence of high percentages of paraffins in the toluol produced by this plant which led to an investigation resulting in the ability to control the composition of the crude benzol and tar produced within wide limits and at the same time produce naphthalene or wash oil at the naphthalene scrubber, at will.

Another pioneer member of the Association was Mr. Ernest Bury, of Skinningrove, who set out and nearly succeeded in the achievement of the ideal that no coal other than what was charged into the coke oven should be used in a modern steelworks. He also succeeded in producing alcohol from coal gas but, while physically possible, this venture did not turn out to be a commercial success.

Electrostatic tar precipitation was a thing unheard of until recently, and the resulting benefits in the cleanliness of the sulphate and life of benzol absorbing oils were enormous. One of the latest developments was the modern centrifugal for sulphate. The basket of this machine revolved in a vertical plane instead of horizontally as hitherto, the salt being discharged by a plough automatically operated. By the use of this machine, one sulphate man and his assistant could easily handle ten tons of sulphate per shift.

Sulphate of ammonia, once a valuable source of revenue, had fallen upon evil times in late years, but could still be produced to show a profit on modern plants. The marketing of by-product sulphate, however, became increasingly difficult, chiefly on account of its inferior quality in many cases as compared with sulphate from other sources. He was confident, however, from developments at present taking place towards the production of a better and purer crystal in coke oven sulphate, that they were within sight of holding their own in this market. Benzol and it homologues continued to find a ready market, and the indications were that the future would call for more and more of these products. Tar was a product whose value varied more than that of any other coke oven by-product, chiefly on account of variations in pitch prices. The increasing demand for creosote oil for hydrogenation, however, and for cresylic acid should tend to maintain the value of this product.

The Annual Dinner

Presiding at the annual dinner, Mr. Johnson was supported by Lord Greenwood, chairman of Dorman, Long and Co., Ltd., Mr. T. Westthorp (immediate past-president of the Association), Sir Philip Dawson (president of the Institute of Fuel), Mr. Stephen Lacey (president of the Institution of Gas Engineers), Mr. W. A. S. Calder (past-president of the Society of Chemical Industry), Dr. F. S. Sinnatt (director of Fuel Research) and representatives of many kindred associations.

Lord GREENWOOD proposed the toast of the Association and said that as chairman of a great steel company he appreciated the invaluable work of the coke oven managers and was proud of the fact that the manager of his company's new plant was president of their Association. The members of the Association had contributed to the advancement of the application of science to the production of coke to an extent and at a rate undreamt of a few years ago. No one more appreciated their efforts than those associated with the industry who could not claim any technical knowledge of their profession. The advance in science in connection with the production of coke demanded a scientific attainment and hard practical experience that had made theirs a selective profession.

Dangers of Prosperity

The coal, coke, iron and steel industries had passed through bad times but they were now enjoying a reasonable wave of prosperity. But the dangers of prosperity were, if anything, greater than the dangers of adversity. There was no reason to believe that the prosperity of to-day would last for all time. There was nothing more depressing in their industry than the fact that export trade did not seem to recover at the rate they would like to see. They lived almost entirely upon a home demand; when that demand began to fall they would encounter fierce competition abroad from those countries that paid low wages and worked much longer hours. Our future export trade depended upon meeting that fierce competition. We could only do it by our superiority of scientific attainment and by the goodwill and co-operation of all those engaged in the great basic industry.

The PRESIDENT, in reply, said no branch of heavy industry had made such progress as coking during the past 21 years, and the lion's share of the credit for that progress was due to the early members of their Association.

Mr. D. V. HOLLINGWORTH proposed the toast of the guests, and extended a hearty welcome to Mr. Stephen Lacey, Mr. W. A. S. Calder, Sir Gilbert Morgan, Professor R. V. Wheeler, Lieut.-Col. French, and the representatives of a large number of constructional firms.

Mr. STEPHEN LACEY and Mr. W. A. S. CALDER briefly responded.

Building and Equipping a New Factory—II

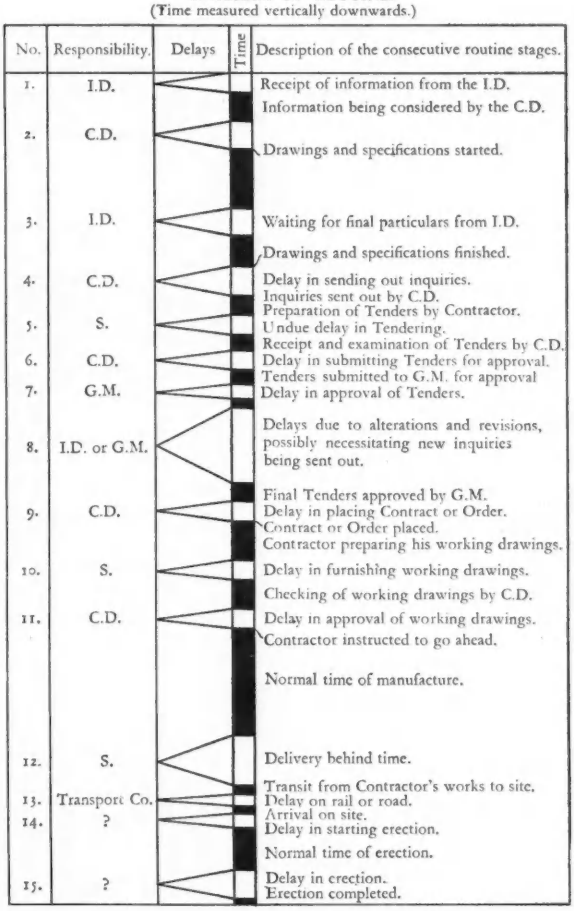
A Routine Diagram

By J. H. WEST, M.I.Chem.E.

BEFORE leaving the question of the time programme and going on to discuss in detail the office end of the job, which is the subject matter of this article, we may profitably study a routine diagram which shows all the various stages through which practically every item of plant and equipment has to pass from start to finish, and the points where delay may and probably will occur.

It will be found that in most cases there are four parties concerned in the matter, first the party which supplies the basic technical information, which we will call the Information Department, or I.D.; secondly, the Construction Department, or C.D., which translates the information received from the I.D. into practical shape, makes the drawings, prepares specifications, places orders and contracts, and generally gets the work done; thirdly, the General Management, or G.M., which looks after the financial side, and authorises the placing of orders and contracts; and lastly, the Contractor or Supplier, S., who manufactures and very likely erects the plant and puts up the buildings.

DIAGRAM OF ROUTINE.
(Time measured vertically downwards.)



The heavy black vertical line on the diagram shows the normal time required for each stage of the routine, and the gaps indicate delays, which, it will be noted, may occur at fifteen different points. Obviously the diagram is not to scale since the normal times will vary with each item, but a study of the diagram is useful before filling in the time programme sheet, since it is quite useless to put down times in the latter which are normal or net; allowance must be made for delays which are bound to occur to some extent. It is much better to draw up a conservative programme and to be able to keep to it or even anticipate it slightly than to draw up an optimistic one and then fail to keep to it. We will now go through the various stages of office routine and note the important points to keep in mind at each, and the best ways of saving work and avoiding delay.

When the I.D. have got ready their particulars of any given item it is as well for a representative of the C.D. to run through the particulars personally with the I.D. man who prepared them, especially if he is a chemist. Ambiguities will thus be cleared up and any vital information which is lacking can be asked for.

As regards the preparation of drawings, little need be said here beyond emphasising the necessity for the most careful checking before issue. The extra time spent on this may save costly mistakes and delays later on. The main points to be checked are, that dimensions are correct, *i.e.*, that chain dimensions agree with overall dimensions, and that dimensions in different views agree; that the drawings and specification agree on all points; and that all necessary information is given on the drawings. The checker should study a drawing from the point of view of the man who has got to make the thing, and ask himself whether he has got on it all the information he would need for that purpose.

The drawing up of a good specification demands a good deal of practice and care. The specification should start with a clear statement of what it covers, *i.e.*, number, and type of machines or vessels; for instance, "The manufacture, delivery, erection, and testing of four sets of direct-coupled motor-driven centrifugal pump sets including combined bedplates." The duty and conditions of working should next be given, and after that the specification of the materials to be used for the various parts. British Standard Specifications should be used wherever possible to cover the quality of materials. The fittings required should be specified, and also any tests to be carried out either at the manufacturer's works or after erection. If the contractor is to erect, he should be told the height from the ground at which the plant is to be erected if not on the ground floor, and it should be made clear whether he is to provide lifting tackle and scaffolding, and unskilled as well as skilled labour. The provision of holding-down bolts and the grouting in of machine and bolts should be mentioned if the contractor is to do this work.

Before going on to the question of inquiries, it may be pointed out that it is a great convenience and saving of time if the lists of plant and equipment have the items provided with plant reference numbers. These numbers should be so arranged as to be a key to where any given item belongs. The number should begin with a letter indicating the building or section in which the item will be located, followed by a number indicating the main item of plant to which it belongs, and finally a number indicating the individual item. For instance, item A31/7 may be the starter for the motor of a rotary drier 31 in Building A, and B65/9 may be the cooling coil in tank 65 in building B. These plant reference numbers should be used on all documents relating to the respective items, drawings, specifications, correspondence, inquiries, orders, and delivery notes. They save a great deal of confusion and result in everybody, whether at head office, con-

sultant's office, the site, or contractor's works, knowing exactly what is referred to when a given item is mentioned.

The sending out of hundreds of inquiries is a tedious business, and if the job is a big one it pays handsomely to get out a standard printed form of inquiry embodying all the wording which is common to all inquiries. It is then only necessary to fill in the name of the contractor or supplier, the brief description of the goods inquired for (this should be identical with that at the top of the specification), the date by which tenders must be received, and the numbers of the drawings enclosed. This form is then posted with a copy of the specification, prints of the drawings, and a copy of the "General Conditions of Contract for Plant and Equipment."

On any but the smallest jobs it is necessary to drawn up a set of "General Conditions of Contract"; in fact two of these will be necessary, one for building work and one for plant and equipment. These conditions deal with matters common to all contracts, and save their repetition in the specifications for individual pieces of plant; such things as, all goods being of British manufacture, workmanship and quality being of the best, contractor's men on site being paid union rates of wages, procedure in the event of a contractor becoming bankrupt or failing to complete his contract, arbitration in case of disputes, and so on.

For small orders not involving erection a shortened set of "Conditions of Purchase" may with advantage be used. It should be clearly laid down that the acceptance of these "Conditions" by the contractor or supplier is an essential part of the contract and that they shall override any "Conditions of Tender" which may be printed on or sent with the tender. On the standard inquiry form the guaranteed time of delivery reckoned from the date of order or instructions to proceed, should be asked for, and, if erection is included, the time required for erection and completion ready to operate.

The Handling of Tenders

A few words are desirable regarding the handling of tenders when received. A summary should be made out showing the respective prices and dates of delivery, with a column in which any differences between the various offer as regards quality, robustness, or the inclusion or omission of fittings or accessories should be noted. What is considered to be the most advantageous offer from all points of view should then be accepted without further communication with the tenderers unless any point in the offer needs elucidation. Representatives of tenderers should not be allowed to call and discuss their offers before a decision is reached, and they should never be allowed to amend their tenders except in the case of an obvious mistake or slip. The practice of certain firms, who hold a sort of Dutch auction after receipt of tenders by telling the tenderers that their price is high and allowing them to amend it, is thoroughly dishonest and constitutes, in the writer's opinion, a very shady way of doing business, but it is not as uncommon as one would expect.

One final point regarding the standard inquiry form is that the tenderer should be invited to submit as an alternative offer his nearest standard machine or apparatus. Considerable saving in cost can generally be effected if a standard article can be utilised. Tenders should, of course, be accompanied by a full specification of what is offered, with a clear disclaimer of any accessories or services which are *not* included, and the drawings necessary to show the details of construction. Working drawings will only be supplied after the order is placed.

It is a good plan to place the order in two stages. As soon as it is decided which offer is to be accepted a standard printed "Acceptance of Tender" form can be posted. This enables the contractor to order the materials for the job and to start his working drawings which have to be submitted for approval. This form should give the actual calendar dates on which delivery and completion are due on the times given in the tender and the contractor should be asked to confirm these. At this stage there may be a few minor modifications to be introduced by one side or the other involving changes in price. When all these have been finally adjusted the official "Order" form can be posted. Standard printed "letters of regret" should be sent to the unsuccessful tenderers.

As soon as the contractor's working drawings come in they should be most carefully checked. This is the last chance to spot mistakes. If they are not promptly returned the contractor will have a good excuse for being behind time. Prints of the contractor's approved drawings should be sent to the site so that the resident engineer will be familiar with them when the plant arrives. If inspection during manufacture is to be carried out copies of the specifications and approved drawings should be sent to the inspector with the name and address of the works where the plant is being made.

Schedule Contracts

Before leaving the subject of contracts and orders, something should be said about "Schedule Contracts" as opposed to lump sum contracts. Most building contracts are schedule contracts and some of the plant and equipment contracts will also be of this type. Take the lagging of steam pipes. This is practically always done on a schedule of prices, so much per foot run for each diameter of pipe with extras for covering flanges and valves. When the job is finished it is measured up and payment made accordingly. The supply, with or without erection, of all kinds of pipework is also frequently arranged on a schedule basis. This system has the advantage that the contract can be let before all the drawings are ready, and time is saved in obtaining lump-sum quotations for many different items. On the other hand, the total amount of expenditure involved is not known until the contract is completed and measured up.

Progressing the Work

One of the most important aspects of the office work is that of progressing, or "chasing" as it is sometimes known. It is at least one man's whole-time job, first to know exactly what the position is regarding any item at any given moment, and, secondly, to see that no delay is occurring at any of the fifteen points indicated on the chart. The progress man needs to be a hustler who will go bald-headed after anyone who is holding up the job from managing director to junior clerk. He will keep a book or a series of sheets on which the dates of passing each stage in the routine are entered for every item, and if any item gets overlooked or hung up at any stage it is his job to find out the reason why, and get the necessary person or people to do something about it then and there. Another of his duties is to see that the resident engineer on site is provided with copies of all drawings and specifications, and at the end of each month with a list of the plant items due for delivery during the coming month with the dates for each.

(To be continued.)

Soda Production in Manchuria

CONSIDERABLE interest in Japanese chemical circles was aroused by the recent foundation of the Manchuria Soda Co., in Hsinking. The company will have an authorised capitalisation of Yen 8,000,000, half paid, with the South Manchuria Co. and the Manchuria Chemical Industry Co. taking Yen 2,000,000 each. The remaining half will be taken up by the Asahi Glass Co. and the Shoko Glass Co., according to reports. The new concern will start erection of a factory at Kanseishi, near Dairen, immediately. It will receive its supply of ammonia from the near-by plant of the Manchurian Chemical Industry Co. and will produce 100 metric tons of soda ash a day, production being due to start by July, 1937.

The Hypochlorite Oxidation of Cellulose

Effect of the Presence of a Reduced Vat Dyestuff

THE first meeting of the Manchester Section of the Society of Dyers and Colourists for the 1936-37 Session was held in the lecture room of the Literary and Philosophical Society on October 16, when a paper on " The Hypochlorite Oxidation of Cellulose in the Presence of a Reduced Vat Dyestuff " was presented jointly by Mr. H. A. Turner, M.Sc., A.I.C., Mr. G. M. Nabar, B.A., M.Sc., and Mr. F. Scholefield, M.Sc., A.I.C., and a large attendance of members was presided over by Mr. N. Chappell, M.Sc.

Some years ago, said Mr. Turner, his collaborators and himself were concerned in extending their knowledge of the light active properties of vat dyestuffs on cotton and rayon, following up the pioneer work of Mr. Scholefield. They evolved a hypothesis to account for some of the peculiarities of this action, and from it they were led to expect that the leuco compound of the vat dyestuff should accelerate the attack of oxidising agents upon the cellulose upon which it was dyed. They believed that this action should take place in the dark, and it would therefore be different from most of the other tendering actions in which vat dyes had hitherto been shown to participate. They tested their hypothesis experimentally, using hypochlorite as the oxidising agent, and found that with quite a number of vat dyestuffs the presence of the dye in the leuco state caused very distinct and rapid chemical degradation. Under similar experimental conditions, the dyes in the ordinary, fully oxidised condition were practically without effect. Every leuco compound that was tried showed some accelerating action. That of Cibanone Orange R., Anthra Yellow G.C., Caledon Yellow G., Hydron Yellow N.F., and G.C., and one or two others was very large.

Three Possibilities

If there was a system consisting of cellulose and hypochlorite which, under ordinary conditions, only reacted slowly, and if the introduction of a third substance, the leuco compound, caused a speeding up of the reaction, there were three possibilities. Firstly, the leuco compound might have acted by increasing the reactivity of the hypochlorite solution; secondly, by increasing the reactivity of the cellulose upon which it was dyed; finally, if neither of these possibilities appeared to be confirmed distinctly, the leuco compound might act by acting as a go-between, taking oxygen from hypochlorite and passing it on in a form suitable for assimilation by the cotton. It was thought that the first step in coming to a decision on this question was to carry out the accelerated oxidation varying systematically such experimental factors as the temperature, hypochlorite concentration, leuco dye concentration, hydrogen ion concentration of the solution, etc.

Of these factors the influence of the hydrogen ion concentration seemed first to merit attention. Other workers had shown the powerful influence exercised by pH on the hypochlorite oxidation of cellulose, a subject of great technical importance. Oxidations were carried out on reduced dyeings of a variety of vat dyestuffs at a number of pH values. Measurements were made of the degradation of the cellulose by the cuprammonium fluidity. For many of these dyes the curve showing the relation of pH with the degradation produced during a standard hypochlorite treatment had a similar and quite distinctive shape. Like an unaccelerated oxidation of cellulose the maximum attack occurred at about pH 7, but there was also a secondary maximum at about pH 9.

A cold solution of sodium hypochlorite was used, containing 3 grams of available chlorine in the litre, treating the reduced dyeings for a standard time of 10 minutes. In that time fluidities of up to 30 were reached at pH 7. To get fluidities of this magnitude when there was no leuco dyestuff present required some hours. The question arose, was this two-peaked curve obtained with a number of leuco dyestuffs a reflection of the influence of change of pH upon the reactivity of the cellulose, upon the reactivity of the hypochlorite solution, or simply upon the accelerating efficiency of the leuco compound. Some information was available as to how far the tendency of oxidising agents to oxidise cellulose could be measured by the oxidation potential of their solutions.

Transfer of Electrons

All oxidations and reductions consisted essentially of a transfer of electrons from the molecule of the oxidised compound to the oxidising agent. An oxidising agent was therefore a substance which could readily take up electrons, and this readiness could, with certain qualifications, be accepted as a measure of the oxidising power of the agent. When an electrode of some different metal, such as platinum, was dipped into a solution of the oxidising agent, there was a tendency for the oxidising agent to remove the negatively charged electrons from it, leaving it with a positive charge, and setting up a difference of potential between the electrode and the solution. The more powerful the oxidising agent, the higher this potential difference. This potential was called the oxidation potential of the solution. In many cases it could, quite readily, be measured experimentally.

Synthetic Organic Chemicals

Some New Uses and Developments

IN the latest issue of their general American catalogue " Synthetic Organic Chemicals," General Metallurgical and Chemical, Ltd., give particulars of some of the more significant developments of the last year or two.

Ethanolamines are now used for neutralising traces of acidity in mineral and vegetable oils for minimising their disposition to corrosion in engineering applications. The organic soaps of ethanolamines are generally freely soluble in oils, and are formed without liberation of water. Higher alcohols, such as octyl alcohol, are used for blending traces of water and soaps into oils; this application is of much value in dry cleaning and the production of textile detergents.

The use of dichlorethyl ether for the solvent refining of lubricating oils by dissolving out the inferior constituents of the crude oil, which have poor lubricating value owing to their wide variations of viscosity with temperature, is another new feature. The process has the merit of simplicity due to the use of a single solvent. Ethylene dichloride can be used for purifying paraffin wax from oils by selection extraction, and as a solvent for the new synthetic rubber substitutes, such as Duprene, and as the active principle in wax-free paint removers.

High Boiling Solvents

The use of high boiling solvents for synthetic resins, oils and nitrocellulose, such as butyl Cellosolve in the newer types of paint finish based on oil-modified synthetic resins, and " combination " lacquers made from these and nitrocellulose has received considerable attention. The demand in Great Britain for nitrocellulose finishes to be made or used in premises not licensed by local authorities to employ products flashing below 90° F., which still possess fairly rapid drying qualities and reasonable cost, is admirably met by the new solvent methyl amyl acetate.

Advances in the fine chemical field during the last year or two have been legion, due to the introduction of new reactive intermediates. A good example is the availability for the first time commercially of methyl aceto-acetate, made by a synthetic process independently of the Geuther method, and more economical in use than the better known ethyl ester.

A Refresher Lecture on Analytical Chemistry

Organic Precipitants, Electrometric Methods and Adsorption Indicators

THE fourth of a series of refresher lectures sponsored by the Glasgow Section of the Institute of Chemistry was delivered by Dr. A. B. Crawford, lecturer in analytical chemistry, at the Royal Technical College, Glasgow, on October 16, his subject being "Analytical Chemistry."

The lecturer reminded the audience of the two great essentials of analytical work—speed and accuracy. By a combination of gravimetric and volumetric methods the speed of an estimation could often be increased. The accuracy attainable by modern chemical methods is illustrated by the close approximation to atomic weights as determined by Aston's mass spectrograph, the difference between the chemical and physical atomic weights of hydrogen, which led to the discovery of heavy hydrogen, being of the order of 2 in 10,000.

Nickel Estimations

Reference was then made to organic precipitants used in analytical practice—to the chelated nickel dimethylglyoxime compound used for nickel estimations, where this nickel complex may be weighed directly, or its hydrolysis product estimated volumetrically. The use of 8-hydroxyquinoline as a reagent for the quantitative separation of metals in acetate or tartrate solution was then mentioned, and its use exemplified in the estimation of aluminium. It was mentioned that 8-hydroxyquinoline precipitates could, in many cases, be brominated, and the estimation concluded volumetrically. The pyridine thiocyanates of metals, at one time considered theoretically as examples of Werner's structural formulæ, were shown to be very sensitive tests for such a metal as cooper, which could be detected in dilutions of 1 in 800,000 by the green colour of a chloroform extract of the complex.

Thereafter, the lecturer dealt with volumetric methods involving hydrogen ion concentration, and electrometric methods of titration. In the first section he showed the advantages accruing from the use of mixed indicators—changes of pH being rendered more evident contrasting colour produced. Simpson's application ("J. Ind. Eng. Chem.," 1924, *16*, 709) of the Cresol Red-Thymol Blue mixture as a means of indicating the half-stage point in carbonate titrations was mentioned. The accuracy of such mixed indicators is 0.5 pH. The use of the Hellige comparator and the B.D.H. capillator was then demonstrated and emphasis laid on the necessity for care when indicators were used with weakly buffered solutions.

Determination of Ash

The advantage of electrometric methods by which the course of a titration could be followed was discussed, and details of conductometric and potentiometric titrations given. Several types of apparatus were shown, particularly a valve oscillator for use in conductometric work. The lecturer dealt at some length with a new conductometric formula for the determination of ash in any cane molasses (Lever and Mazumder, "Int. Sugar J.," 1936, *36*, 214), by means of which the percentage of ash was evaluated by determining the specific conductivity of a 0.5 per cent solution and applying the formula:

Ash per cent. = specific conductivity × 14282 + 1.028.

The simplicity of the method and the ease of calculation would seem to be factors of importance in the determination, and the fact that the estimation can be carried out in twenty minutes is a further recommendation. The formula is not applicable to any other concentration, nor to beet molasses.

In addition, practical demonstrations showed the use of such adsorption indicators as dichlorofluorescein and di-iodofluorescein with silver nitrate in the estimation of halides; the use of diphenylamine as an internal indicator with potassium dichromate in the estimation of iron. The use of the newer oxidant, ceric sulphate, in place of the dichromate in the above iron estimation was shown, using xylene cyanol FF as internal indicator. Ceric sulphate may also be used in the titration of hydroquinone using diphenylamine internally.

The Depressed Areas

Practical Suggestions for Removing a Blot

As the Special Areas Act expires at the end of the present financial year, the appearance of "Employment and the Depressed Areas," by T. Powys Greenwood (Routledge, 3s. 6d.) is opportune, for besides summarising what has been done so far, its author makes many practical suggestions for the solution of this tragic problem. Naturally, opponents of the Government ascribe the trouble to the "failure of capitalism," but it will be a shock to business readers to learn from an ardent believer in private enterprise that this charge is largely true. Mr. Greenwood maintains that the depressed areas offer a genuine commercial opportunity, and challenges business to render what is really the best form of service to the unemployed. "It can never be sufficiently emphasised that the economic life of the community is not an impersonal structure, but a living entity dependent above all upon the efforts and energies of individual men and women."

Urging that business men should go into the depressed areas with "something of the spirit of a crusade," Mr. Greenwood remarks that the connection between social service and productive enterprise has not yet been fully established. Business men often take a keen interest in social service; they give money and serve on committees. "But business is business and charity is charity, and never the twain shall meet." Social workers, on the other hand, too often lack understanding of commercial principles and methods. Through idealism, or perhaps ignorance of economic theory, some of them have become imbued with a rooted distaste for "enterprises for purposes of gain." Others are led by their sympathy for the men into the same attitude of mistrust, yet actually social workers occupy an important strategic point between employers and prospective employees. One obstacle to the starting of factories in the distressed areas is the mistaken belief that the men are "difficult to handle." Informal meetings between business men and the unemployed would dispel this impression, and would also assist a most important factor in curing these areas—labour transference.

Mr. Greenwood supports these general suggestions with a number of concrete proposals. His conclusions are all the more encouraging since based on a first-hand study of the theories practised in Russia and in the Totalitarian States, whose spectacular schemes for curing unemployment should not, in Mr. Greenwood's view, be copied in this country. He pleads instead for the essentially English method of trial and error, believing that if business men co-operate with the Government in tackling the distressed areas, their findings will afford a valuable guide for the further evolution of our economic system in general. Unlike most writers on unemployment, he does not blame this system or call for sweeping changes, but asserts that the problem can be solved, provided—and this is the crux of the matter—that a really vigorous attitude is adopted. How urgently this is required is revealed by the fact that, out of 6,000 firms outside the depressed areas, to whom the special Commissioners sent a questionnaire, only 64 gave helpful answers and over 4,000 did not bother to reply. A glorious opportunity is available to cure the greatest blot on English life to-day.

Aliphatic Alcohols

Synthesis Under Pressure

A LECTURE entitled " The Synthesis of Aliphatic Acids Under Pressure " was delivered by Dr. D. V. N. Hardy, of the Chemical Research Laboratory, Teddington, before a joint meeting of the Manchester Section of the Society of Chemical Industry and the local members of the Chemical Society, which was held at the Constitutional Club, Manchester, on October 2, with Mr. A. McCulloch, M.Sc., presiding.

The lecturer stated that as a result of investigations carried out at the Chemical Research Laboratory, it had been found possible to produce several of the simple aliphatic acids from alcohols and carbon monoxide under high pressure.

The process is conducted in a circulatory form of high pressure apparatus in which a mixture of alcoholic vapour, steam, and carbon monoxide under a pressure of 200 atmospheres is bubbled through hot phosphoric acid, which functions as a catalyst. Acetic acid and methyl acetate are the principal products from methyl alcohol, but when phosphoric acid alone is used as a catalyst, these products are accompanied by a considerable amount of complex hydrocarbons, the chief constituent of which is hexamethylbenzene. This parasitic formation of hydrocarbons is eliminated when 2 per cent. by weight of copper phosphate is added to the phosphoric acid, and the production of acetic acid is correspondingly increased. Formation of acetic acid varied considerably with reaction temperature, and the best results were obtained at 330-340°.

By employing as catalyst a solution of 14 grams of copper phosphate in 700 grams of 87 per cent. phosphoric acid it was possible to produce 110-120 grams of acetic acid per hour with a yield of 82 per cent. calculated on the basis of methanol consumed. Wastage was principally due to conversion of methanol into carbon and to the production of carbon dioxide and methane. The evidence suggests that the reaction involves the formation of the methylene radical which, in the presence of copper phosphate, combines with carbon monoxide to give ketene. In the absence of copper phosphate part of the methylene passes into complex hydrocarbons by a process involving dehydrogenation and polymerisation.

From ethyl alcohol small amounts of propionic acid and ethyl propionate were obtained at temperatures between 250° and 370°, but, at the same time, from two to three times as much ethyl alcohol was converted into polymerides of ethylene.

Both *n*- and *iso*-propyl alcohol reacted readily at 210-215° and led to a mixture of *iso*-butyric acid with complex acids containing 7, 10 and 13 carbon atoms, together with lesser amounts of the polymerides of propylene. The formation of the various products is explained on the hypothesis that the alcohols act solely as sources for propylene, which either combines with carbon monoxide and steam to give *iso*-butyric acid or polymerises to higher olefins.

With the butyl alcohols, of which *n*-, *sec*- and *iso*- were employed, the situation was fundamentally similar, but was complicated by the fact that the three butylenes are interconvertible. As a result, each of the butyl alcohols gave rise to a mixture of methylethylacetic acid ($MeEtCH.CO_2H$) and pivalic acid ($Me_3C.CO_2H$), together with the more complex acids derived from butylenic polymerides.

The hypothesis that acids were formed by the interaction of olefins, carbon monoxide, and steam was confirmed by experiments with ethylene, propylene and 2-butylene. In each case the anticipated acids were produced. In view of the availability of olefins from the cracking of hydrocarbon oils, this reaction may become of commercial importance.

ANIMAL by-product exports from Argentina showed a substantial gain during the first half of 1936 as compared with the corresponding period of 1935. Shipments of bones rose from 24,919 metric tons to 33,994 tons, dried blood rose from 5,261 to 5,766, and other fertilisers from 24,919 to 33,994.

British Industry at Work

A New Book on Ways and Means

THE elementary economic principles on which there is little dispute among experts can seldom have been explained more lucidly than by Mr. Geoffrey Crowther in " Ways and Means " (Macmillan, 4s. 6d.). This little book of 200 pages deals with the economic structure of Great Britain to-day, based on up-to-date statistics which are summarised in a number of simple charts.

Beginning with a study of the national income, the author emphasises the complexity of modern trade. The distinction between capital goods and current goods is, of course, one of the most important in the whole of economics, but the remarkable growth in the number of those engaged in " services," now estimated at 40 per cent. of the working population, is not so generally realised. Out of a dozen workers to-day, nearly five are service performers, three are making current goods, two are exporters, one a maker of capital goods, and two unemployed. This analysis, though adding up to a "baker's dozen" of thirteen, may be considered approximately accurate.

Housewives, who contribute a very substantial portion of the national income, are not included in this calculation, but their important part in the economic life of the country bears out the principle just mentioned—that the total wealth consists not only of the tangible goods available for the citizens of the nation, but also of the services they perform for each other. Further, while the sort of thing we consume does not vary very much from person to person, the ways in which we earn our living show almost endless variations.

Two families live side by side, each consuming very much the same commodities, and yet the bread-winner in one may be a clerk in a city office, dependent for his living on the ups and downs of the market in pea-nuts, while the other earns his living by making sparking plugs for aeroplane engines. Even such a comparatively simple product as a loaf of bread has required the labour and services of scores of different trades to make it—not only the baker, the miller and the farmer, but makers of ovens and milling machinery, and reaping machines, several sorts of merchants and many varieties of transport workers. And behind the machinery-makers are all the trades engaged in producing iron and steel, right back to the miners of coal and iron ore. This leads Mr. Crowther to remark that the public is far too ready to forget how very remarkable it is that such a complicated system should work at all—that the machine-tool maker whose work seems so very far removed from the loaf of bread, can yet find employment and wages.

The author has some hard things to say about our traditional attitude to the export markets, particularly in the heavy trades. We have been too inclined to expect the world to go on wanting our coal, cotton and steel, instead of supplying the newer and more complicated things such as motor cars, special machinery, artificial silk and manufactured footstuffs, for which there is a growing sale overseas. This criticism is not new, but will bear repeating, for although many exceptions could be named, we have only lately begun to move fast enough for the changing demands of the world market. In this connection the interesting fact emerges that the industrialisation of foreign countries, far from diminishing our potential market, actually increases it.

Every business man is entitled to take a just pride in the story told by Mr. Crowther, whose " Ways and Means "—available in a half-crown edition for schools, works libraries, clubs, etc.—deserves the widest possible circulation.

ANHYDROUS ammonia imports into Argentina during 1935 totalled approximately 750,000 kilos. The recently-announced amplification of exchange regulations by the Argentine Ministry of Finance should facilitate imports from United States. Chief suppliers at present are United Kingdom and Germany.

Micro-Plasticity in Crystals

An Investigation of Tin

THE August issue of the "Proceedings of the Royal Society" contains a paper by Bruce Chalmers, B.Sc., Ph.D., on the micro-plasticity in crystals of tin. This paper has now been issued by the International Tin Research and Development Council as Technical Publication Series A, No. 44. It is stated that many problems relating to the fundamental properties of the metallic state can best be approached through experimental investigations on single crystals of metals. In this investigation the nature and characteristics of the yield point were examined to find out whether the value obtained for the yield point is real or a function of the accuracy of measurement. The relations between tension, length and time for single crystals of tin of high purity were measured by an optical interference method. A number of new phenomena have been notived, notably plasticity below the accepted yield point and called by the author "micro-plasticity." The results are discussed in relation to slip and distortion in the crystal space lattices.

Agglutinating Value of Coal

British Standard Method for Determination

THE suitability of a coal for many industrial purposes depends to a great extent upon the properties of the solid residue remaining after carbonisation, and as the caking or agglutinating property of a coal largely affects the nature of this residue it is desirable that some comparative measure of agglutinating properties should be available.

The British Standards Institution has just issued "British Standard Methods for the Determination of the Agglutinating Value of Coal," B.S.S. No. 705-1936. Careful consideration has been given to methods that have been devised, in this country and abroad, for comparing the agglutinating properties of coals, and the conclusion has been reached that of the existing forms of test the Gray-Campredon afforded the most reasonable comparison. Investigations have shown that modifications are desirable in the test as previously specified, and these alterations have been incorporated in the method now proposed. The test recommended is essentially intended for the grouping of coals according to their agglutinating values, and is proposed so that experience may be gained of its utility in the carbonisation industries.

The agglutinating value is, for the purpose of this test, defined as the maximum ratio of sand to coal which, upon carbonisation, will give a coherent mass capable of supporting a 500 g. weight, the proportion of loose powder being less than 5 per cent. of the weight of sand and coal. The test is empirical in form and it has been ascertained that, while an individual can obtain concordant results, a high degree of concordancy is not to be expected between different operators. It is therefore recommended that the agglutinating value as determined by the test should be applied to assessing the agglutinating index of the coal according to the grouping shown below:—

Agglutinating Index.	Agglutinating Value.
Above 35	Over 35
31/35	31 to 35
26/30	26 to 30
21/25	21 to 25
16/20	16 to 20
11/15	11 to 15
6/10	6 to 10
Below 5	5 and below

Perhaps one of the most difficult problems which the committee has faced during the preparation of the method has been that of the provision of a reliable standard sand for use in the test. The Institution, and indeed all fuel chemists, are indebted to the Director of Fuel Research, who has assumed the responsibility for the provision of a sand in accordance with the specification.

Irish Free State Imports

Statistics for Chemicals and Related Products

IMPORTS into the Irish Free State of chemicals, drugs, perfumery, dyes and colours during the nine months January-September, 1936, show an increase in value as compared with the corresponding period last year, though the total quantity decreased. The biggest fall was in the importation of crystalline sodium carbonate, from 106,616 cwt. in 1935 to 507 cwt. in 1936.

The complete details are as follows, the figures for 1935 being given in parentheses:—

Acids, 17,789 cwt. (15,593), £17,983 (£16,141); calcium carbide, 8,602 cwt. (7,962), £5,846 (£5,639); chemical food preservatives and flour improvers, £43,518 (£47,082); copper sulphate, 3,163 tons (3,083), £43,069 (£40,812); disinfectants, etc., 10,452 cwt. (12,079), £35,147 (£37,768); potassium compounds, 5,239 cwt. (6,144), £8,207 (£8,692); sodium carbonate in crystalline form, 507 cwt. (106,616), £246 (£26,045); caustic soda, 32,602 cwt. (33,733), £11,139 (£12,719); other sodium compounds, 170,250 cwt. (164,660), £71,435 (£69,913); cream of tartar, £1,825 cwt. (2,364), £5,981 (£7,881); chemical manufactures and products, n.e.s., £139,440 (£114,630).

Perfumery, cosmetics, etc., £24,552 (£27,868); medicines and medicinal preparations, £205,196 (£217,242); dyes and dye-stuffs, 3,560 cwt. (2,954); tanning materials, 61,756 cwt. (21,566); paints, distempers and enamels (liquid and paste), 10,888 cwt. (16,273), £29,718 (£47,741); lead, white (including stiff paste), 29,806 cwt. (22,523), £13,824 (£11,352); ochre and earth colours, 10,122 cwt. (6,499), £10,283 (£6,499); other descriptions, 56,612 cwt. (46,385), £60,062 (£48,817).

Grit from Factory Chimneys

Fuel Research Experts Advise Cleaner Coal

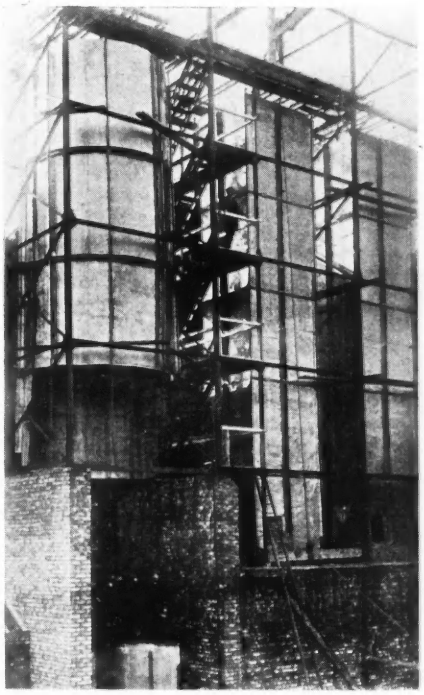
THE suggestion that the work of preventing the emission of dirt and grit from industrial plants was beginning at the wrong end by installing devices in the chimney to arrest its discharge, instead of using cleaner coal, was made in a joint paper by Mr. A. T. Barber and Mr. T. F. Hurley, of the Fuel Research Station, read at the National Smoke Abatement Conference at the Science Museum, London, on October 14-17.

It was pointed out that there is unfortunately ample evidence everywhere of the need for directing still greater attention to methods of preventing emission of dust and grits from industrial plants, first by improvement in furnace design and operation, and secondy by installing suitable efficient dust arrestors. The emission of dust from boiler stacks is to some extent preventable by the use of cleaned coals. The necessity for cleaning coal of all grades is becoming more and more recognised, and as the demand increases and the price margin between clean and dirty coal diminishes, the use of clean coal becomes still more economical on all grounds. In fact, it is worth while carefully to consider how far the expense of providing and maintaining dust collecting apparatus may be obviated by the use of clean coal in place of some of the so-called cheap fuels. In addition to reducing the amount of ash, the cleaning of coal in many cases effects a considerable reduction in the sulphur content.

A committee of the British Standards Institution is engaged on the preparation of a standard method of testing dust extraction plant. To carry this work to a satisfactory conclusion further experimental work must be done on actual boiler plants, involving the cutting of the chimney for installing the necessary apparatus, and it is essential that the plant conditions should cover as wide a field as possible in order that the influence of all the variable factors should be accurately assessed. The co-operation of industrial concerns is needed for this, but up to the present most owners of boiler plant seem chary of allowing investigations to be carried out on their chimneys, and the work is severely handicapped in consequence.

Lead in the Construction of Sulphuric Acid Plants

Left.—Fig. 1.—A method of construction employed in the erection of a Moritz plant in 1910.



Right.—Fig. 2.—A Moritz installation for sulphuric acid erected by Mr. Parrish in 1913.

Below.—Fig. 3.—A Gaillard-Parrish tower chamber built in 1930, and now in operation at a London works.

THE accompanying illustrations are reprinted from an article on "Lead in the Construction of Sulphuric Acid Plants," by Mr. Parrish, in the special Lead Section of THE CHEMICAL AGE of May 9, in order to remove a misunderstanding with regard to the various types of plant referred to in the article.

Fig. 1 shows a method of construction employed in the erection of a Moritz plant in 1910, according to British Patent No. 11128. This arrangement, as Mr. Parrish stated in his article, represented a marked advance on anything hitherto attempted in the construction of sulphuric acid chambers. Not only was the whole of the lead presented to view, but it was easily accessible, and it afforded that flexibility yet withal adequacy of support which are so essential to the longevity of the lead. Moreover, it admitted of better cooling than was formerly possible, particularly if arrangements were made for cold air to enter the gangway, and to discharge itself through a louvre arrangement at the top.

In January, 1912, Mr. J. H. Brown, late managing director of Simon-Carves, Ltd., and Mr. Parrish made an inspection of several Moritz plants in France and Belgium and were impressed not only with the improvement of chamber construction, but with the satisfactory working results secured. It was appreciated that the Moritz system combined all the elements for intensive operation along with satisfactory protection of the leadwork. Subsequent consideration revealed that a possible deterrent to the adoption of the Moritz chamber sytsem in this country would be the factor of initial capital expenditure, which represented about 15 per cent. more than the outlay on plant having the usual wooden structure. Eventually, a steel supported cylindrical void chamber was designed, the first two of which were erected at Dewsbury by Mr. Parrish in the early part of 1913. Fig. 2 represents a Moritz installation for sulphuric acid erected by Mr. Parrish at the works of H. D. Pochin and Co., Ltd., at Warrington, in 1913, incorporating improvements and modifications as a result of the experience gained with the two tower chambers originally installed at Dewsbury.

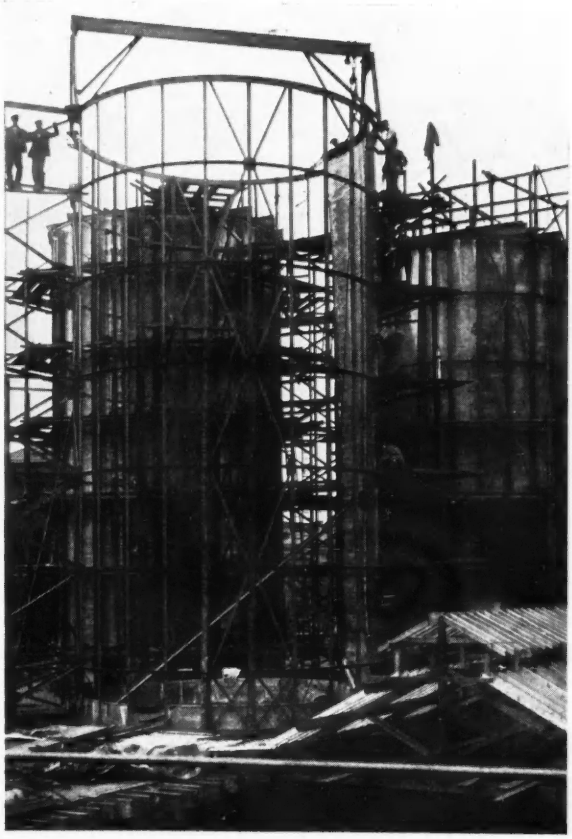


Fig. 3 shows the Gaillard-Parrish tower chamber built in 1930 and now in operation at a London works. It shows the plant in course of erection.

Spontaneous Combustion

Use of Tin Salts for Suppression

THE autoxidation of textile oleins and oils has sometimes caused considerable losses by spoiling materials treated with them and even by starting fires. To counteract the autoxidation, various organic reducing compounds have been used successfully, but many of them are objectionable since they often cause staining, impart a smell and are mostly poisonous.

The International Tin Research and Development Council has just published Technical Publication Series A, No. 45, entitled "The Retarding Effect of Stannous Salts on the Oxidation of Olein and Oils." This is a report of work carried out for the Council by Dr. S. H. Bertram at the Nederlandsche Research Centrale, The Hague, showing that oil-soluble salts of tin, in the stannous condition, are good anti-oxidation catalysts free from these disadvantages. Additions of the order of 0.1 per cent. of stannous oleate, stearate, or benzoate to textile oils considerably delay the onset of oxidation and greatly retard oxidation once it has started.

The mechanism of the retarding effect of stannous salts has been investigated and it has been found that a direct relationship exists between the oxidisability of the textile-spinning lubricants and their content of per-oxides. The oxidation products are probably the real catalysers of the oxidation of the oleins or oils. The anti-oxidation effect of the stannous salts is due to their ability to reduce these highly catalytic oxidation products.

Empire Raw Materials

Investigations Reported by the Imperial Institute

PROMINENT amongst the features of the July-September issue of the "Bulletin of the Imperial Institute" is an authoritative article on the Gold Coast bauxite deposits, by Dr. W. G. G. Cooper, of the Gold Coast Geological Survey. Another interesting article deals with the production, utilisation and marketing of the little known columbite-tantalite minerals. The Empire is the chief source of this group of minerals, tantalite coming mainly from Australia, whilst the bulk of the world's columbite supplies is obtained as a by-product from the tinstone deposits of Nigeria. Tantalite is used mainly for the manufacture of metallic tantalum and certain special steels. The metal has also been recommended for certain plant equipment and chemical apparatus on account of its property of resisting the corrosive action of most chemicals. Until recently, columbite was regarded as a valueless and rather uncommon mineral. Considerable research and investigation, however, appears to have established the fact that the addition of ferro-columbium to chromium-nickel steels not only reduces their intergranular corrosion, thus improving their corrosion- and oxidation-resisting properties, but also has other beneficial effects. Further outlets for columbium are in welding chromium-nickel steels, in wireless valves and in the manufacture of cathodes for the electro-determination of certain metals.

Mr. A. W. Knapp, chief chemist to Cadbury Bros., Ltd., concludes in this number his series of articles on "Scientific Aspects of Cacao Fermentation." He deals with the production of acetic acid during fermentation; the effect of ripeness on the process; improved methods of fermentation; processes which have been suggested for bringing about the desired results without fermenting the beans; combined fermentation and heat treatment; and finally, aroma in cacao. He sums up in these words: "We have seen that scientists have made valuable contributions to our knowledge of fermentation, but that no theory of the production of the desirable bean is sufficiently complete to enable us to state an alternative to, or improvement on, the traditional methods. In tracing out how the natural processes give us the desirable qualities, many things have been made clear, but the production of the substances which on roasting give the characteristic odour and flavour remains obscure."

The usual "notes" cover a wide range of subjects. Attention is called to the arrangements made by the Imperial Institute's Sub-Committee on Tung Oil for the marketing of small quantities of tung nuts now becoming available in certain Empire countries. A brief account is given of the preparation and uses of laurel oil (obtained from the berries of *Laurus nobilis*) and also a summary of recent American work in the utilisation of soybean oil in paints. Other subjects dealt with include selenium poisoning of crops and stock; the occurrence of selenium in natural and manufactured phosphates; the Ratnagiri chromite deposit, Bombay; the River Irrawaddy oilfield, Burma; the use of magnetite in the manufacture of heavy concrete; and possible uses for spent fuller's earth.

Light Oil Refining

New Solvents and Resin Isolated

A BROAD study of the refining of light oils at by-product coke plants is being carried on at Mellon Institute of Industrial Research, Pittsburgh, Pa. P. J. Wilson, jr., and J. H. Wells, who are in charge of this work, have recovered from the residues several new products, including a series of high-boiling oils and a dark stable resin, which can be produced in large quantities at low cost.

The high-boiling oils are largely aromatic hydrocarbons with small proportions of paraffins and compounds soluble in 80 per cent. sulphuric acid. The general characteristics of these oils are: Boiling range, between 180° C. and 375° C.; specific gravity, 0.950 to 1.030 at 15.5° C.; corrosion, negative by copper strip test; acid number, 0.1. The oils possess excellent solvent properties They are solvents for rosin and resinates, many natural gums, a large number of synthetic resins, rubber and chlorinated rubber, and "Thiokol"; sulphur and paraffin are dissolved to a limited extent in the cold. The oils are miscible with most of the commercial organic solvents, and are not affected by water, brine, alkalies or dilute mineral acids. The characteristics of the oils suggest applications for them in many industries, such as the manufacture of paint, varnish and lacquer, rubber, wood preservatives, insecticides and fungicides, cleaning agents, roofings, floorings and asphalt.

The new resin is apparently a mixed polymer of cyclic dienes and aromatic olefin compounds. Its principal characteristics are: Colour, brown to black; melting point, soft to 140° C.; specific gravity, 1.150; flash point, high (the 65° C. melting point resin has a flash point of 260° C.); free carbon, none; emulsification, the lower melting resin is readily emulsified with water. This resin is soluble in many commercial solvents, including the aromatic hydrocarbons, drying oils and chlorinated hydrocarbons. It is slightly soluble in alcohol and petroleum hydrocarbons. It is miscible with sulphur, many gums and resins, including rubber, indene-cumarone resins, rosin, asphalt and coal-tar pitch and pine tar. Uses for this resin are indicated in such fields as adhesives and binders, including those for road work and briquets, varnishes and paints, pipe coatings, linoleum and floor tile, rubber compounding and battery seals.

Further information regarding either the solvents or resin may be obtained on direct request to Mellon Institute of Industrial Research, Pittsburgh, Pa.

BELGIAN gelatine manufacturers are attempting to develop broader markets for bone phosphate in every country. With some farmers in Belgium and France it has replaced the use of bone meal, with others it has been introduced as a bone builder. In other markets, however, the Belgian precipitated phosphate is sold only as a fertiliser, and whatever attempts have been made to introduce it as a cattle feed have had little success.

Personal Notes

MR. SAMUEL MCKENZIE, on the occasion of his retirement after 37 years' service at Ardeer Factory of Imperial Chemical Industries, Ltd., Stevenson, Ayrshire, where he was assistant foreman in the nitrating department, has been the recipient of a presentation from his fellow-workers.

MR. E. M. BAILEY, J.P., chief chemist to Scottish Oils, Ltd., has retired. Mr. Bailey entered the service of the Pumpherston Oil Co., Ltd., in 1894 as a junior chemist. Two years later he became chief chemist, and in 1925 was appointed chief chemist to Scottish Oils, Ltd., with headquarters in their new central laboratory, Middleton Hall, Uphall.

MR. FREDERICK BARKER, of Bamford, Lancashire, died on October 21 at the age of 62. At the time of his death he was managing director of the dyeing and bleaching business started about forty years ago at Simpson Glough by his father, the late Mr. R. Barker, who had been manager of Hampson Mills, Blackford Bridge, Bury, for Abraham Barlow, Ltd. Mr. Frederick Barker, who was the eldest son and a native of Hollins, near Bury, was engaged in the dyeing department of the same mills.

SIR ROBERT HORNE was the principal guest at the annual dinner of the Institute of Industrial Administration, which was held at Grosvenor House on Wednesday under the presidency of Mr. Harold Macmillan, M.P. Among others who accepted invitations were Lord Leverhulme (president of the Society of Chemical Industry), and Sir Edward and Lady Crowe.

MR. WILLIAM R. LIVSEY will, next month, have completed 50 years' service with William Blythe and Co., Ltd., chemical manufacturers of Church, Lancashire. He started with the firm in November, 1886, as assistant cashier, and was subsequently appointed cashier. Since August 10, 1923, he has held the position of secretary of the company, and he is also secretary of the Sizing Materials Co., Ltd.

Chemical Notes from Foreign Sources

Hungary

MANUFACTURE OF FAT ALCOHOLS is to be undertaken by Rudolph Schwarz and Co., of Budapest.

France

MANUFACTURE OF CITRIC ACID by fermentation of molasses and sugar syrup will be undertaken by the Société Sucrière du Calvados, at Courseulles-sur-Mer, permission having been granted for erection of a factory.

Russia

THE AREA UNDER CULTIVATION in European Russia with the rubber plant, Kok-Sagis, is to be increased from 520 hectares to 5,000 hectares, while an additional 1,500 hectares are to be planted in Kazakstan. A factory for extraction of rubber from the plant will also be erected next year.

Czechoslovakia

A FORMER SUGAR FACTORY at Zidovitz, near Raudnitz, is being adapted for the manufacture of wrapping paper by a new firm with a share capital of 1 million kronen.

METHYL CHLORIDE FOR REFRIGERATING PLANTS is now being produced by the Ergasta Chemical Works on a scale which it is hoped will satisfy the entire home demand.

THE PRODUCTION OF PHOTOGRAPHIC CHEMICALS, including a new developer permitting development and fixing in the same bath, has been embarked upon by the Oderberg Chemical Works (closely associated with the Ossig Chemical Union).

Italy

AN AGREEMENT REGARDING EXCHANGE OF PATENTS and experience in the coal hydrogenation field has been reached between the S.A. Azienda Nazionale Idrogenazione Combustibili and the International Hydrogenation Patents Co. (embracing the Standard Oil Co., the Royal Dutch Shell Group, the I.G. Farbenindustrie, and Imperial Chemical Industries, Ltd.).

PLANS HAVE BEEN APPROVED for the following new developments in the chemical field: Extraction of glycerine and crude potassium salts from sugar beet residues (S.A. Distilleria di Cavarzere, Cavarzere); silicon carbide manufacture (Ing. Guiseppe Carletti, Milan); coumarin manufacture (Industria Nazionale Colori Anilina, Milan); isolation of solvents from petroleum (Soc. Italiana Raffinazione Rivendita Olii Minerali, Milan); rubber-regenerating plant (S.A. Italiana Rappresentanze Estere Nazionali, Milan).

Germany

A WOOD PULP FACTORY IS BEING BUILT by the I.G. Farbenindustrie and is expected to be ready for production in February, 1937. It is understood that both the sulphite process and the nitric acid process will be applied, the latter yielding a wood pulp of superior quality. The respective daily outputs of the two departments are estimated at 100 tons and 25 tons.

Japan

ALUMINIUM SULPHATE AND ALUM are to be manufactured on a larger scale by the Nagoya Myoban K.K., of Nagoya, which is increasing its capital to 1 million yen for this purpose.

VINYL ACETATE IS NOW BEING MADE at the Mizumata factory of Nippon Chisso Hiryo K.K., and urea at the Konan factory of the same firm by condensation of ammonia with carbon dioxide.

THE RECENTLY-FORMED COAL HYDROGENATION CONCERN in which the Japanese Government, the South Manchurian Railway Co., and various Japanese industrial interests are participating, will commence its activities with a capital of 100,000,000 yen, which is likely to be doubled.

Belgium

THE UNION CHIMIQUE BELGE, for the year ended June 30, have announced a trading profit of 42 million francs (against 23 million) and a net profit of 23 million francs (against nil). Announcement of a net divident of 18.95 francs per share is anticipated at the general meeting in November. Accounting in some measure for the satisfactory figures, states the report, was the low price policy on the home market and the establishment of a special export organisation. Research work in the medicinal chemical department has led to introduction of two new remedies against leprosy and malaria. Production has expanded in the photographic section to meet increased demand for silver bromide paper and plates for aerial photography. In connection with the facilities offered by the concern to outside firms in the chemical industry, it is co-operating with the Hydro-Nitro Company, of Switzerland, in erecting a nitric acid factory for the account of the Terni Company, of Milan. According to rumours quoted in the "Chemische Industrie," the Union Chimique Belge is to be merged in the near future with the Compagnie Chimique and Industrielle de Belgique.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Open to Public Inspection

PRODUCTION OF DEXTROSE.—International Patents Development Co. April 17, 1935. 15185/35.

COLLOIDISED VAT DYES.—Calco Chemical Co., Inc. April 18, 1935. 6283/36.

MANUFACTURE OF TITANIUM TETRACHLORIDE.—Soc. Des Produits Chimiques de St.-Bueil. April 16, 1935. 9871/36.

MANUFACTURE OF THREADS, bands, films, and the like from polystyrols. I. G. Farbenindustrie. April 13, 1935. 10308/36.

METHOD OF PREPARING METALLIC SULPHATES from sulphide ores and the like.—American Zinc, Lead and Smelting Co. April 15, 1935. 10683/36.

MANUFACTURE OF STABLE WATER-CONTAINING OINTMENTS, pastes, creams, emulsions, and the like.—Deutsche Hydrierwerke, A.-G. April 13, 1935. 10739/36.

PROCESS FOR THE MANUFACTURE OF READILY SOLUBLE SALTS of 9-amino-acridine compounds.—I. G. Farbenindustrie. April 13, 1935. 10771/36.

METHODS AND AGENTS FOR REMOVING ENAMEL from enamelled articles.—I. G. Farbenindustrie. April 13, 1935. 10772/36.

MANUFACTURE OF VAT DYESTUFFS.—Soc. of Chemical Industry in Basle. Feb. 4, 1935. 28030/36.

Specifications Accepted with Date of Application

MANUFACTURE OF SURFACE-ACTIVE SUBSTANCES.—W. J. Tennant (Henkel and Cie, Ges.). March 7, 1935. 455,086.

PROCESS FOR DEPHOSPHORISING and desulphurising steel.—Soc. D'Electro-Chimie, D'Electro-Metallurgie et des Acieres Electriques D'Ugine. March 7, 1934. 455,042.

SEPARATION OF WAX from mineral oil by filtration.—Texaco Development Corporation. March 31, 1934. 455,272.

MANUFACTURE OF POLYMERISABLE COMPOUNDS.—Triplex Safety Glass Co., Ltd., and J. Wilson. March 13, 1935. 455,087.

PRODUCTION OF FAST TINTS on cellulose fibres.—A. G. Bloxam (Soc. of Chemical Industry in Basle). April 10, 1935. 455,274.

PROCESS FOR THE MANUFACTURE OF ANTHRAQUINONE DERIVATIVES. A. Carpmael (I. G. Farbenindustrie.) April 11, 1935. 455,092.

FROTH FLOTATION OF ORES.—American Cyanamid Co. May 9, 1934. 455,224.

PREPARATION OF 1-PHENYL-3-METHYL-PYRAZOLONE-5 and related compounds.—Carbide and Carbon Chemicals Corporation. April 21, 1934. 455,094.

METALLIC TUNGSTEN POWDER, particularly suited for the manufacture of thick filamentary incandescent bodies.—Egyesult Izzolampa Es Villa-Mossagi Reszvenytarsasag. April 14, 1934. 455,282.

MANUFACTURE OF CUPRIFEROUS DYESTUFFS.—I. G. Farbenindustrie. April 17, 1934. 455,229.

PROCESS FOR DYEING CELLULOSE ACETATE ARTIFICIAL SILK.—A. Carpmael (I. G. Farbenindustrie). April 15, 1935. 455,285.

LUBRICATING-OILS.—C. C. Wakefield and Co., Ltd., and E. A. Evans. April 15, 1935. 455,235.

MANUFACTURE OF WATER-SOLUBLE AZO DYESTUFFS.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie). April 16, 1935. 455,352.

LUBRICANTS.—E. I. du Pont de Nemours and Co. April 24, 1934. 455,304-5.

THERAPEUTICALLY VALUABLE METAL COMPOUNDS of keratinic acids.—R. Von Wülfing, and E. Möller (trading as J. A. Wülfing (firm of)). Sept. 15, 1934. 454,813.

MANUFACTURE OF FILMS, threads, sheets, or the like, and the manufacture of resins therefor.—H. E. Potts (Shawinigan Chemicals, Ltd.). Dec. 27, 1934. 454,691.

CONCENTRATION OF ALIPHATIC ACIDS.—British Celanese, Ltd. Oct. 5, 1934. 454,891.

LIGHT-SENSITIVE LAYERS incorporating diazonium compounds.—Naamlooze Vennootschap Philips' Gloeilapenfabrieken. Oct. 10, 1934. 454,814.

PRODUCTION OF RED LEAD.—E. Barthelmess. Jan. 4, 1935. 454,901.

MANUFACTURE OF DIHYDRO-DESOXYMORPHINE D.—Hoffmann-La Roche and Co., A.-G. May 6, 1935. (Addition to 451,203.) 454,747.

PRODUCTION OF DRINKING WATER from sea water.—Dr. F. Steingiesser. Feb. 1, 1936. 454,993.

MANUFACTURE OF DYESTUFFS for esters of cellulose and products resulting therefrom.—Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reunies Etablissements Kuhlmann. March 5, 1935. 454,757.

MANUFACTURE OF ESTERS OF POLYCYCLIC ALCOHOLS.—Schering-Kahlbaum, A.-G. April 8, 1935. 455,018.

RECOVERY OF HORMONES.—A. J. H. Kongsted, and H. L. P. Kjems. May 5, 1936. 454,778.

MANUFACTURE OF N-METHYL-C, C-ALLYL-ISOPROPYL-BARBITURIC ACID.—F. Hoffman-La Roche and Co., A.-G. May 17, 1935. 454,779.

MANUFACTURE OF ESTERS of polycyclic alcohols.—Schering-Kahlbaum, A.-G. April 8, 1935. 455,019.

DERIVATIVES OF ANDROSTENOLS.—A. Carpmael (Schering-Kahlbaum, A.-G.). Feb. 6, 1935. (Divided out of 3886/35.) 455,020.

PRODUCTION OF ACYL COMPOUNDS of polycyclic alcohols of the cyclopentano polyhydrophenanthrene series.—W. P. Williams, and Schering-Kahlbaum, A.-G. March 4, 1935. 454,918.

Applications for Patents

(October 15 to 21 inclusive).

PRODUCTION OF MIXED CELLULOSE ESTERS.—Afag Finanzierungs, A.-G. (France, Oct. 18, '35.) 28439.

PRODUCTION OF FISH-LIVER OILS.—Allen and Hanburys, Ltd. 28657.

MANUFACTURE OF ALIPHATIC ANHYDRIDES.—H. A. Auden, H. P. Standinger, and Distillers Co., Ltd. 28020.

MANUFACTURE OF CELLULOSE ACETONITRATES.—E. Berl. 28119.

MANUFACTURE OF HEAT-INSULATING MATERIAL.—E. Berl. 28120.

MEANS FOR REDUCING RISK OF EXPLOSIONS.—E. Berl. 28122.

MANUFACTURE OF SMOKELESS POWDERS.—E. Berl. 28123.

SEPARATION OF CRUDE OIL FROM ROCK.—E. Berl. 28607.

PROCESS FOR MANUFACTURING ACYLATED DERIVATIVES.—E. Berl. 28608.

PROCESS FOR MANUFACTURING ACID CHLORIDES.—E. Berl. 28609.

PROCESS FOR MANUFACTURING ACID ANHYDRIDES.—E. Berl. 28610.

PROCESS FOR MANUFACTURING AMMONIUM SALTS of nitro-hydroxy compounds.—E. Berl. 28611.

MANUFACTURE OF A COLLOIDAL PRODUCT from wool fat.—A. Carpmael (I. G. Farbenindustrie.) 28034.

MANUFACTURE OF TANNING MATERIALS.—A. Carpmael (I. G. Farbenindustrie). 28201.

PROCESS FOR MANUFACTURING MANGANESE PIGMENTS.—A. Carpmael (I. G. Farbenindustrie). 28527.

PRODUCTION OF FOAMS FROM COMPOUNDS of cellulose, etc. W. P. Cohoe. 28046.

MANUFACTURE OF OXYGENATED ORGANIC COMPOUNDS.—E. I. du Pont de Nemours and Co. (United States, Oct. 22, '35.) 28671.

DISTILLATION PROCESSES.—Eastman Kodak Co. (United States, Oct. 26, '35.) 28299.

PRODUCTION OF FISH-LIVER OILS.—N. Evers. 28657.

METHOD OF LIQUEFYING COAL, ETC.—S. Fujikawa. 28290.

MANUFACTURE OF DYESTUFFS of the anthraquinone series.—W. W. Groves (I. G. Farbenindustrie). 28027.

PROCESS FOR EXTERMINATING INSECTS.—I. G. Farbenindustrie. (Germany, Dec. 7, '35.) 28029.

PROCESS FOR EXTERMINATING INSECTS.—I. G. Farbenindustrie. (Germany, Aug. 19.) 28156.

MANUFACTURE OF PIGMENTS DYESTUFFS of the phthalocyanine series.—I. G. Farbenindustrie. (Germany, Oct. 23, '35.) 28202.

COLOURING ORGANIC MASSES.—I. G. Farbenindustrie. 28280.

MANUFACTURE OF CONDENSATION PRODUCTS.—I. G. Farbenindustrie. (Germany, Oct. 18, '35.) 28366.

MANUFACTURE OF VAT DYESTUFFS of the anthraquinone series.—I. G. Farbenindustrie. (Germany, Oct. 22, '35.) 28431.

MANUFACTURE OF MONOAZO DYESTUFFS.—I. G. Farbenindustrie. (Germany, Oct. 22, '35.) 28432.

MANUFACTURE OF LUBRICATING OILS.—Imperial Chemical Industries, Ltd., and D. E. White. 28065.

ANTHRAQUINONE DYESTUFFS.—Imperial Chemical Industries, Ltd., and H. C. Lumsden. 28214.

ACTIVATED MAGNESIUM OXIDE.—L. Mellersh-Jackson (Marine Chemicals Co., Ltd.). 28080.

MANUFACTURE OF MAGNESIUM PRODUCTS.—L. Mellersh-Jackson. (Marine Chemicals Co., Ltd.). 28676.

PRODUCTION OF FATTY ACIDS from oils, etc.—H. Kaufmann. 28041.

MANUFACTURE OF HYDROCARBON MIXTURES.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (Holland, Nov. 1, '35.) 28436.

MANUFACTURE OF ASPHALTIC, ETC., EMULSIONS.—O. Ovregard. (Norway, Oct. 29, '35.) 28213.

PROCESS FOR PRODUCING ALCOHOLS, ETC.—S. J. Ralph and W. H. A. Webb. 28258, 28259.

PURIFICATION OF LIQUIDS.—Anon pour tous Appareillages Mecaniques. (France, Feb. 7.) 28389.

MANUFACTURE OF VAT-DYESTUFFS.—Soc. of Chemical Industry in Basle. (Feb. 4). (Switzerland, Feb. 4, '35.) 28030.

MANUFACTURE OF VAT-DYESTUFFS.—Soc. of Chemical Industry in Basle. (Switzerland, Jan. 15). 28031.

PRODUCTION OF FAST SHADES.—Soc. of Chemical Industry in Basle. (Switzerland, Oct. 19, '35.) 28367.

PRODUCTION OF FAST SHADES.—Soc. of Chemical Industry in Basle. (Switzerland, Oct. 5.) 28368.

Forthcoming Events

LONDON.

Nov. 2.—Society of Chemical Industry and Institution of Petroleum Technologists. "The Manufacture of Chemical Products Derived from the Petroleum Industry." Dr. A. E. Dunstan. 8.0 p.m. Burlington House, Piccadilly, London.

Nov. 3.—Institution of Civil Engineers. Opening Meeting. Sir Alexander Gibb. 6 p.m. Great George Street, Westminster, London.

Nov. 3.—British Association of Refrigeration. Symposium of Addresses on "Corrosion in the Refrigerating Industry." 6.30 p.m. Institute of Marine Engineers, 85-88 Minories, London.

Nov. 4.—Society of Public Analysts. "The Turbimetric Titration of Gelatin Solutions." J. F. Morse. "Colour Measurement of Opaque Surfaces." E. Richards Bolton. "The Determination of Benzoic Acid" and "The Detection and Determination of p-Hydroxybenzole Acid." F. W. Edwards. 8 p.m. Burlington House, Piccadilly, London.

Nov. 4.—Royal Society of Arts. "180 Years of Pioneer Work by the Royal Society of Arts." Colonel Sir Henry McMahon. 8.30 p.m. John Street, Adelphi, London.

Nov. 5.—Mineralogical Society. General Meeting. 5.30 p.m. Burlington House, Piccadilly, London.

Nov. 5.—British Road Tar Association. Annual meeting and luncheon. 1 p.m. Grosvenor House, London.

Nov. 5.—Institute of Fuel. "Should the Number of Colliery Screen Sizes be Reduced." A. Grounds. 6.30 p.m. British Industries House, Marble Arch, London.

Nov. 5.—Chemical Society. "The Photoreactions of Acetone in Solution." E. J. Bowen. "Studies in Chemisorption on Charcoal." Parts VI and VIII. A King and C. G. Lawson. "Recent Applications of Surface Film Measurements to the Elucidation of the Structures of Organic Molecules." F. A. Askew. 8 p.m. Burlington House, Piccadilly, London.

Nov. 6.—Society of Chemical Industry. (Chemical Engineering Group.) "Acid Resisting Industrial Filters." Dr. F. Singer and W. E. Speirs. 7.30 p.m. Royal Technical College, London.

Nov. 6.—Royal Institution of Great Britain. "The Chemical Exploration of the Stratosphere." Professor F. A. Paneth. 9 p.m. Albemarle Street, London.

BIRMINGHAM.

Nov. 2.—Chemical Society. "Sterols, Sex Hormones and Carcinogenic Hydrocarbons." Professor J. W. Cook. 5 p.m. Chemistry Lecture Theatre of the University, Edgbaston, Birmingham.

Nov. 5.—Institute of Metals (Birmingham Section). "Present Trend in Alloy Constructional Steels." J. A. Jones. 7 p.m. James Watt Memorial Institute, Birmingham.

Nov. 6.—Society of Chemical Industry (Birmingham and Midland Section). "Cacao Shell and its Use as an Accessory Fodder." A. W. Knapp and A. Churchman. "Brewery By-Products and their Utilisation." Professor R. H. Hopkins. "Utilisation of By-Products in the Meat Packing Industry." Osman Jones. 6.45 p.m. University Buildings, Edmund Street, Birmingham.

BRISTOL.

Nov. 5.—Society of Chemical Industry. "High Pressure Technique." R. Taylor. 7.30 p.m. Chemical Department of the University, Woodland Road, Bristol.

GLASGOW.

Nov. 6.—Society of Chemical Industry (Glasgow Section). "Acid-resisting Industrial Filters." Dr. F. Singer and E. W. Speirs. 7.45 p.m. Glasgow.

HULL.

Nov. 3.—Hull Chemical and Engineering Society. "The Safeguarding of Machinery with Special Reference to Machine Tools. A. B. Crawford. 7.45 p.m. Hull Photographic Society's Room, Grey Street, Park Street, Hull.

MANCHESTER.

Nov. 2.—Institute of the Plastics Industry. "Moulding Practice and Costing System." B. W. Steel. College of Technology, Manchester.

Nov. 3.—Literary and Philosophical Society. "Soils." Mrs. M. C. Wright. 5.30 p.m. 36 George Street, Manchester.

Nov. 5.—Manchester Metallurgical Society. Joint Meeting with Institute of Metals. 7 p.m. Constitutional Club, St. Ann's Street, Manchester.

Chemical and Allied Stocks and Shares

FOLLOWING the recent upward movement in share values there has been a fair amount of profit-making in evidence and the tendency was for rather lower prices to rule. Shares of chemical and kindred companies were quite well maintained and there were numerous individual features of interest. Distillers, for instance, have risen further from 111s. 6d. to 112s. 6d. on the important future indicated for the company by the growing importance of industrial alcohol and on the belief that unless it is the intention to distribute a bonus of some kind eventually the dividend for the current year may be increased to 22½ per cent. Turner and Newall at 101s. 6d. have not kept best prices but were again active. It is realised that the present price may discount the increased dividend expected for the current year, but it has to be read in relation to the large scope for increased profits next year if activity in the engineering and allied industries is continued and if world trade conditions show a good measure of improvement.

Goodlass Wall and Lead Industries were firm at 14s. 9d. This company also has important interests outside home trade and will benefit if improved world trade conditions develop. It continues to be assumed in the market that the lead section of the business is benefiting from the greater activity in the metal and its higher price. It is largely on this that anticipations of an increase in the dividend to 7½ per cent. persist. Imperial Chemical were a few pence down at 41s. 7½d., the disposition being to await news as to whether the scheme for consolidating the ordinary and deferred capital is to be effected. Salt Union were steady and are held firmly on the company's good dividend record. Unilever were again active around 40s. on hopes that the interim dividend will be increased next month.

Pinchin Johnson continued to attract a good deal of attention on the possibility of a bonus of some kind sooner or later in view of the statement at the last meeting that the company has reserves and undivided profits in excess of its requirements. Lewis Berger remained under the influence of hopes that a larger dividend may be announced shortly and Indestructible Paint and International Paint were both more active, the latter on the demand for ships' paints expected owing to the much larger amount of shipbuilding in progress.

Boots Pure Drug were steady and Timothy Whites and Taylors rose to 35s. on continued expectations that a larger dividend will be announced shortly and on reports that plans for further expansion of the business may be announced. There was also activity in South African Druggists on expectations for a good final dividend. British Drug Houses were in better demand and have now moved up to 20s. (business has been marked up to close on 21s.) on a more general recognition of the company's steady dividend record and that on the basis of last year's 5 per cent. distribution a favourable yield is offered by the shares. The 4s. shares of British Glues and Chemicals transferred actively around 8s. 9d. and British Industrial Plastics 2s. shares continued to change hands around 4s.

There was a rather sharp set-back in British Oxygen despite expectations of an increased interim dividend. Dorman Long ordinary and preferred ordinary shares were again prominent on the belief that the forthcoming results will show an excellent increase in profits. The market believes that the directors will decide to follow a conservative dividend policy, pending a move to reduce interest and other charges, but there are anticipations that shareholders may have the offer of additional shares on favourable or bonus terms. Consett Iron were also again a prominent feature on the view that earnings on the ordinary capital as reduced by the reconstruction may be running at a high level.

Wall Paper deferred have reacted to 48s. 1½d. awaiting the impending dividend announcement. Richard Thomas were better on the belief that in declaring the interim dividend in the early part of next month, the directors may announce the terms of the issue of ordinary shares which it was stated at the last annual meeting will be on a basis that offers a bonus to shareholders and a satisfactory premium to the company. Imperial Smelting fluctuated moderately, but have held most of their recent improvement. Fison, Packard and Prentice were steady, awaiting the meeting. The assumption in the market is that this year profits are likely to benefit a good deal more fully from some of the company's more recent developments. General Refractories were active on the further acquisition made by the company and Leeds Fireclay ordinary were better on hopes that the report may announce the resumption of dividends. Oil shares were reactionary owing to disappointment in the market at the absence of an increase in the Anglo-Iranian interim dividend.

Weekly Prices of British Chemical Products

IN the coal tar products section the price of naphthalene (purified crystals) has been reduced from £22 10s. to £20 per ton, while there have been slight advances in the prices of pyridine and toluol. There are no price changes to report in the markets for general chemicals, rubber chemicals, wood distillation products, pharmaceutical and photographic chemicals, perfumery chemicals, essential oils and intermediates. Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works.

MANCHESTER.—So far as prices are concerned there has been no giving way on the Manchester chemical market during the past week and in most respects conditions are fully firm. As has been the case during recent weeks, however, buying interest has been on a restricted scale, especially in connection with new contracts, although with the approach of the year end there should soon be a spurt, with users covering requirements over part of next year. In the meantime, reasonably satisfactory accounts are forthcoming regarding the movement of supplies of most descriptions of heavy chemicals into consumption against contracts, although there is still plenty of room for improvement in respect of those products whose principal outlet is in the textile dyeing and finishing trades.

GLASGOW.—Business in general chemicals has been very quiet during the week, both for home trade and export. Prices, however, continue quite steady at about previous figures, with no important changes to report. A labour dispute over a cargo of phosphate caused an unofficial strike at Glasgow Harbour, and numerous shipments have been held up as a result. Otherwise trading in coal tar products has been fairly steady. Cresylic and carbolic acids show no noteworthy change. There has been some fresh activity in creosote for export, and virgin oils of high tar acid content are finding a ready outlet. Pitch is moving in greater quantity, and on the basis of transactions concluded there has been no further fall in value. Benzole and naphthas are quieter. Naphthalene inquiries appear rather less numerous than at this period of last year.

General Chemicals

ACETONE.—£62 to £65 per ton; SCOTLAND: £64 to £65 ex wharf, according to quantity.

ACID, ACETIC.—Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £32 5s. to £34 5s.; tech., 40%, £16 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £32 5s.; tech., 80%, £30 5s., d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ACID, BORIC.—Commercial granulated, £27 per ton; crystal, £28; powdered, £29; extra finely powdered, £31; packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. B.P. cryst., £36; B.P. powder, £37. SCOTLAND: Crystals, in 1 cwt. bags, £28; powdered, in 1 cwt. bags, £29.

ACID, CHROMIC.—Flaked, 10d. per lb., less 2½%; ground, 10¼d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—1s. per lb. MANCHESTER: 11¾d. to 1s. SCOTLAND: B.P. crystals, 1s. per lb., less 5%.

ACID, CRESYLIC.—97/99%, 3s. to 3s. 1d. per gal.; pale, 98%, 3s. 1d. to 3s. 2d.; dark, 2s. 6d. to 2s. 7d.; 99/100%, refined, 3s. 4d. to 3s. 6d. per gal. MANCHESTER: 99/100%, pale, 3s. 7d.

ACID, FORMIC.—85%, in carboys, ton lots, £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50: pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works. SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—£48 15s. to £57 10s. per ton, according to packages and position. SCOTLAND: £2 9s. 6d. per cwt. in casks. MANCHESTER: £49 to £54 10s. per ton ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. SCOTLAND: 11¾d. less 5%. MANCHESTER: 1s. per lb.

ALUM.—SCOTLAND: Ground, £10 2s. 6d. per ton; lump, £9 12s. 6d.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM SULPHATE.—Neutral quality, 20.6% nitrogen, £6 19s. per ton.

ANTIMONY OXIDE.—SCOTLAND: £61 to £65 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—LONDON: £13 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £17 10s. ex store. MANCHESTER: White powdered Cornish £18 10s. ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—£11.

BARYTES.—£6 10s. to £8 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.a. London.

BLEACHING POWDER.—Spot, 35/37%. £7 19s. per ton in casks, special terms for contracts. SCOTLAND: £9.

BORAX COMMERCIAL.—Granulated, £14 10s. per ton; crystal £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots. SCOTLAND: Granulated, £14 10s. per ton in 1 cwt. bags, carriage paid.

CADMIUM SULPHIDE.—3s. 11d. to 4s. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums. SCOTLAND: £5 10s. per ton net ex store.

CARBON BISULPHIDE.—£31 to £33 per ton, drums extra.

CARBON BLACK.—3¾d. to 4¾d. per lb. LONDON: 4½d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 2⅜d. per lb.; liquor, £19 10s. per ton d/d

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £3 19s. 6d. net.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £24 10s. per ton. SCOTLAND: 40%, £25 to £28 ex store.

IODINE.—Resublimed B.P., 5s. 1d. per lb.

LAMPBLACK.—£23 to £24 per ton.

LEAD ACETATE.—LONDON: White, £33 15s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £35, brown, £33 10s.

LEAD NITRATE.—£32 10s. to £34 10s. per ton.

LEAD, RED.—SCOTLAND: £32 10s. per ton less 2½%, carriage paid, for 2-ton lots.

LEAD, WHITE.—SCOTLAND: £40 per ton, carriage paid. LONDON: £41.

LITHOPONE.—30%, £16 to £16 5s. per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O P., 1s. 9d. to 2s. 4d.

PARAFFIN WAX.—SCOTLAND: 3⅝d. per lb.

PHENOL.—6¾d. to 7¼d. per lb.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £40.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. less 5%, d/d U.K. Ground, 5¼d. LONDON: 5d. per lb. less 5%, with discounts for contracts. SCOTLAND: 5d. per lb. less 5% carriage paid. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 4¼d. per lb. MANCHESTER: £38 10s. per ton.

POTASSIUM CHROMATE.—6¼d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P. 4s. 3d. per lb.

POTASSIUM NITRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8¼d. per lb. SCOTLAND: B.P. Crystals, 8¼d. MANCHESTER: B.P. 10½d. to 11¼d.

POTASSIUM PRUSSIATE.—LONDON: Yellow, 7¼d. to 8d. per lb. SCOTLAND: 7½d. net, in casks, ex store. MANCHESTER: Yellow, 7¼d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £36.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—LONDON: £21 per ton. SCOTLAND: £17 15s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: £12 10s. per ton in 1 cwt. kegs, £10 15s. per ton in 2 cwt. bags. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. Anhydrous, 5d. per lb. LONDON: 4d. per lb. less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. SCOTLAND: 4d., less 5% carriage paid.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash, £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£29 per ton. SCOTLAND: £1 10s. per cwt.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10 5s.; photographic, £14 10s.

SODIUM IODIDE.—B.P., 6s. per lb.

SODIUM METASILICATE.—£14 per ton, d/d U.K. in cwt. bags.

SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.

SODIUM PERBORATE.—10%, 9¼d. per lb. d/d in 1-cwt. drums. LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£13 per ton.

SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 4¼d. to 4½d.

SODIUM SILICATE.—140° Tw. Spot, £8 per ton. SCOTLAND: £8 10s.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material, £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d. to £3 5s.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid, 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.

SODIUM SULPHITE.—Pea crystals, spot, £13 5s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.

SULPHATE OF COPPER.—MANCHESTER: £15 per ton f.o.b. SCOTLAND: £17 15s. per ton less 5%.

SULPHUR.—£9 to £9 5s. per ton. SCOTLAND: £8 to £9.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 5s. 1d. per lb. in 1-cwt. lots.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.

ZINC SULPHIDE.—10d. to 11d. per lb.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—November, £6 19s. per ton; December, £7 0s. 6d. for neutral quality basis 20.6% nitrogen delivered in 6-ton lots to farmer's nearest station.

CALCIUM CYANAMIDE.—November, £6 18s. 9d. per ton; December, £7; carriage paid to any railway station in Great Britain in lots of 4 tons and over.

NITRO-CHALK.—£7 5s. per ton to end of June, 1937.

NITRATE OF SODA.—£7 12s. 6d. per ton to end of June, 1937.

CONCENTRATED COMPLETE AND AMMONIUM PHOSPHATE FERTILISERS £10 12s. to £11 1s. per ton, according to specification. N.P. fertilisers £10 5s. to £13 15s. per ton for minimum 6-ton lots delivered buyer's nearest station.

Coal Tar Products

ACID, CRESYLIC.—97/99%, 3s. 1d. to 3s. 2d. per gal.; 99/100%, 3s. 6d. to 4s. per gal., according to specification; pale 98%, 3s. 2d. to 3s. 3d.; dark, 2s. 9d. to 2s. 10d. GLASGOW: Pale, 99/100%, 3s. to 3s. 6d. per gal.; pale, 97/99%, 2s. 6d. to 2s. 9d.; dark, 97/99%, 2s. 5d. to 2s. 8d.; high boiling acids, 1s. 8d. to 2s.; American specification, 2s. 9d. to 3s.

ACID, CARBOLIC.—Crystals, 6¾d. to 7½d. per lb.; crude, 60's, 2s. 5d. to 2s. 6d. per gal. MANCHESTER: Crystals, 6¾d. per lb.; crude, 2s. 8d. to 2s. 9d. per gal. GLASGOW: Crude, 60's, 2s. 6d. to 2s. 9d. per gal.; distilled, 60's, 2s. 9d. to 3s. 3d.

BENZOL.—At works, crude, 8½d. to 9d. per gal.; standard motor 1s. 2d. to 1s. 2½d.; 90%, 1s. 3d. to 1s. 3½d.; pure, 1s. 7d. to 1s. 7½d. LONDON: Motor, 1s. 3½d. GLASGOW: Crude, 9d. to 10d. per gal.; motor, 1s. 2d. to 1s. 3d.

CREOSOTE.—B.S.I. Specification standard, 5¼d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 4½d. f.o.r. North: 5d. London. MANCHESTER: 4¾d. to 5¼d. GLASGOW: B.S.I. Specification 5d. to 5¼d. per gal.; washed oil, 4¼d. to 4¾d.; lower sp. gr. oils, 4¾d. to 5d.

NAPHTHA.—Solvent, 90/100%, 1s. 5¾d. to 1s. 6½d. per gal.; 95/160%, 1s. 7d.; 90%, 1s. to 1s. 2d. LONDON: Solvent, 1s. 3¼d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. GLASGOW: Crude, 5½d. to 6d. per gal.; 90% 160, 1s. 4d. to 1s. 5d.; 90% 190, 1s. to 1s. 1d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £12 to £13 per ton; purified crystals, £20 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £5 to £5 10s. per ton; crystals, £27 to £27 10s. GLASGOW: Fire lighter, crude, £7 to £8 per ton (bags free).

PYRIDINE.—90/140%, 6s. 6d. to 9s. per gal.; 90/180, 2s. 3d. GLASGOW: 90% 140, 6s. to 6s. 6d. per gal.; 90% 160, 5s. to 5s. 6d.; 90% 180, 2s. 6d.

TOLUOL.—90%, 1s. 11d. to 2s. per gal.; pure, 2s. 3d. to 2s. 4d. GLASGOW: 90% 120, 1s. 10d. to 1s. 11d. per gal.

PITCH.—Medium, soft, 35s. per ton, in bulk at makers' works. MANCHESTER: 32s. 6d. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 30s. to 35s. per ton; in bulk for home trade, 32s. 6d.

XYLOL.—Commercial, 2s. 1d. per gal.; pure, 2s. 3d. GLASGOW: Commercial, 1s. 11d. to 2s. per gal.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 10s. to £9 per ton; grey, £10 10s. to £11. Liquor, brown, 30° Tw., 6d. to 8d. per gal. MANCHESTER: Brown, £9 10s.; grey, £11 10s.

CHARCOAL.—£5 5s. to £10 per ton, according to grade and locality.

METHYL ACETONE.—40-50%, £45 to £48 per ton.

WOOD CREOSOTE.—Unrefined 6d. to 1s. 6d. per gal., according to boiling range.

WOOD, NAPHTHA, MISCIBLE.—2s. 9d. to 3s. 3d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.

WOOD TAR.—£2 to £3 per ton.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex toluol).—1s. 9½d. per lb. d/d buyer's works.

ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.

ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 8d. per lb.

ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.

ACID, SULPHANILIC.—Spot, 8d. per lb. 100%, d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZIDINE, HCl.—2s. 5d. per lb., 100% as base, in casks.

o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.

p-CRESOL 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.

m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.

DINITROBENZENE.—8d. per lb.

DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 10½d.

DINITROCHLORBENZENE, SOLID.—£72 per ton.

DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.

α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works

β-NAPHTHOL.—In bags, £88 15s. per ton; in casks, £89 15s.

α-NAPHTHYLAMINE.—Lumps, 1s. per lb.; ground, 1s. 0½d.

β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works in casks.

o-NITRANILINE.—3s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.

Latest Oil Prices

LONDON, October 28.—LINSEED OIL was firm. Spot, £27 per ton (small quantities), Nov. to April, £24 12s. 6d.; May-Aug., £24 15s., naked. SOYA BEAN OIL was dull. Oriental, spot, ex tank, Rotterdam, £24 15s. per ton. RAPE OIL was slow. Crude extracted, £33 10s. per ton; technical refined, £34 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £26 10s. per ton; refined common edible, £29 10s.; deodorised, £31 10s., naked, ex mill (small lots 30s. extra). TURPENTINE was steady. Spot American, 38s. 9d. per cwt.

HULL.—LINSEED OIL spot, quoted £24 15s. per ton; Oct., £24 5s.; Nov.-Dec., £24 10s.; Jan.-April, £24 12s. 6d.; May-Aug., £24 15s. COTTON OIL, Egyptian, crude, spot, £26; edible, refined, spot, £28 10s.; technical, spot, £28 10s.; deodorised, £30 10s., naked. PALM KERNEL OIL, crude, f.m.q., spot, £25. 10s., naked. GROUNDNUT OIL, extracted, spot, £34; deodorised, £37. RAPE OIL, extracted, spot, £33; refined, £34. SOYA OIL, extracted, spot, £29 10s.; deodorised, £32 10s. per ton. COD OIL, f.o.r., or f.a.s., 25s. per cwt. in barrels. CASTOR OIL, pharmaceutical, 43s. per cwt.; first, 38s.; seconds, 36s. TURPENTINE, American, spot, 40s. 9d. cwt.

From Week to Week

SIR ALBERT W. WYNN ceased to act as receiver of Herbert Green and Co., Ltd., petroleum refiners, on October 8.

THE OFFICIAL PRICE OF PLATINUM has been lowered another £1 per ounce, to £9 15s. This is the fourth reduction in four weeks, the price having been £14 on September 28.

THE ANNUAL MEETING and luncheon of the British Road Tar Association will be held at Grosvenor House, on Thursday, November 5. Sir David Milne-Watson will preside, supported by Sir Reginald Clarry, M.P., the Association's chairman.

A DEMONSTRATION OF ELECTRIC HEAT-TREATMENT FURNACES arranged with the co-operation of Wild-Barfield Electric Furnaces, Ltd., is being held in the demonstration workshop of the Manchester Corporation Electricity Department, Dickinson Street, Manchester, 1, from October 27 to November 6.

AN IMPORTANT STEP TOWARDS REACHING A SETTLEMENT of the Glasgow dock dispute, which affects about 4,000 men, was taken at a conference of the employers' and the men's representatives on October 23, when it was agreed that a cargo of phosphate on the vessel where the trouble originated should be analysed to ascertain if it contains any ingredient detrimental to health. The dispute arose when thirty-eight men refused to discharge phosphate, demanding a higher rate of payment.

NEGOTIATIONS HAVE BEEN COMPLETED for the erection of a large new paper mill at Nantgarw, near Cardiff, for the production of coated board and paper. The factory is to be built by the South Wales and Monmouthshire Trading Estates, under the Special Areas Development and Improving Act, to the specification of the Coating Mill Co. The total area likely to be eventually covered by the factory is ten acres, and the new company will have a capital of £100,000.

THE IMPORTANCE OF THE PAPER MAKING INDUSTRY to Aberdeen was explained to the North Aberdeen Junior Unionists on October 21, by Mr. J. G. Abel, chief chemist to Alex. Pirie and Sons, Ltd., Stoneywood Paper Mills, when he gave an outline of the history of papermaking and described the processes used in the modern mill to manufacture writing and newsprint paper. About 60,000 tons of paper were manufactured every year in the four mills around Aberdeen, realising annually £2,000,000.

GERMANY IS TO MANUFACTURE ARTIFICIAL SILK FROM STRAW. In accordance with the new four-year plan for German industry a number of new cellulose factories will start operations soon. The most striking feature of the processes to be employed is the turning of straw cellulose into artificial silk. At present the cellulose needed for artificial silk is derived principally from pine wood, much of which has to be imported. Germany, however, has plenty of straw, and very successful tests with this raw material have lately been carried out. Production on a large scale will be started soon by a concern which has hitherto specialised in turning straw into paper.

THE TWELFTH ANNUAL NORMAN LOCKYER LECTURE, established by the British Science Guild as a means of directing the attention of the public to the influence of science upon human progress, will be given by Lord Rutherford, D.Sc., F.R.S., Cavendish Professor of Experimental Physics and director of the Cavendish Laboratory, University of Cambridge, in the Goldsmiths' Hall, Foster Lane, London, E.C.2, on Thursday, November 12, at 4.30 p.m., the subject being "Science in Development." The chair will be taken by Sir Josiah Stamp, president of the British Association for the Advancement of Science. This is the last occasion upon which the Norman Lockyer Lecture will be arranged by the British Science Guild as an independent body. In future the lecture will be carried on under the auspices of the British Association for the Advancement of Science. Tickets for Lord Rutherford's lecture are obtainable, free of charge, on application to the secretary, British Science Guild, 535-7 Abbey House, Victoria Street, London, S.W.1.

TO SATISFY THE REQUIREMENTS of chemical traders in the matter of book-keeping, Mr. S. Howard Withey has invented a new system, simple and inexpensive to maintain, and designed to enable definite economies to be effected. The system is contained in one account book to cover a full year's business transactions. The book can be entered up and balanced by a junior with no previous knowledge of book-keeping. Figures and totals are transferred to pages indicated and a trial balance results, made up as at the stocktaking date. By simply duplicating this trial balance and forwarding the certified copy to Mr. Withey, the client becomes entitled to receive a periodical trading account, a profit and loss account, and a balance sheet without charge. The system does away with separate cash books, nominal ledgers and private ledgers, and the annual cost of two guineas, inclusive, is sufficient to cover expenses for printing, publishing, etc., plus time spent in the preparation of accounts for the client. Mr. Withey desires to ascertain the extent of the demand, and requests that readers willing to give the system a trial should forward their names and addresses to him at Walwyn Court, Much Marcle, Gloucester, without delay.

A SUBSIDIARY OF IMPERIAL CHEMICAL INDUSTRIES, LTD., with a nominal capital of £2,000,000, has been registered in Melbourne, with the object of developing the Australian alkali industry. It will begin operations at Port Adelaide.

C. T. BOWRING AND CO., LTD., and C. T. BOWRING AND CO. (FISH OILS), LTD., have transferred their offices to 209 India Buildings, Water Street, Liverpool, 2. The telephone number, Bank 1336, is unchanged.

DISCUSSING THE QUESTION OF SALARY for the position of manager of the Chemical Works Department, the Glasgow Corporation Gas Committee agreed that this be fixed at £800, rising to £1,000 per annum, and that the position of works manager shall be advertised as Mr. James McLeod, the present manager, is retiring.

THE ANGLO-NORWEGIAN SYNDICATE engaged in mining copper in the Bonmahon district of County Waterford, Irish Free State, is now working at full pressure. Five Swedish experts have been engaged to operate the electrical shaft-sinking apparatus which is being used in the sectors. The work is being done under the supervision of Professor Broughton Edge, one of the three controlling members of the syndicate.

New Chemical Trade Marks

Compiled from official sources by Gee and Co., patent and trade mark agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2.

Donodep. 566,902. Chemical substances used in manufactures or philosophical research, and anti-corrosives. Detel Products, Ltd., Long Drive, Greenford, Middlesex. February 29, 1936.

Monastral. 563,471. Raw, or partly prepared, vegetable, animal, and mineral substances used in manufactures, not included in other classes. British Dyestuffs Corporation, Ltd., Imperial Chemical House, Millbank, London, S.W.1. October 9, 1935.

Paratone. 563,675. Chemical compounds for improving the viscosity-temperature relationship of lubricating oils. Standard Oil Development Co., 100 West Tenth Street, Wilmington, State of Delaware, and 26 Broadway, New York. October 18, 1935. Address for service in the United Kingdom is, c/o D. Young & Co., 11 & 12 Southampton Buildings, London, W.C.2.

Plastomoll. 563,005. Chemical substances for use as softening agents for acyl-cellulose in the course of manufacture. I.G. Farbenindustrie, Grüneburgplatz, Frankfort-on-Main, Germany. September 19, 1935. Address for service in the United Kingdom is, c/o Abel & Imray, 30 Southampton Buildings, London, W.C.2.

Trioran. 567,282. Chemical substances for use as wetting-out or scouring agents in the course of manufacture of textile fabrics. The Hexoran Co., Ltd., The Hives, Mosley Road, Trafford Park, Manchester, 17. March 13, 1936.

Trubenal. 565,784. Chemical substances usel in manufactures, photography, or philosophical research, and anti-corrosives. Commercial Solvents (Great Britain), Ltd., Aldwych House, Aldwych, London, W.C.2, and Bromborough Port, New Ferry, Cheshire. January 17, 1936.

Dixisle. 565,500. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. William Dixon and Co. (Isleworth) Ltd., 240 Twickenham Road, Isleworth, Middlesex. January 3, 1936.

Tangite. 563,453. Chemical substances for purifying and clarifying feed water. Ambrose Fry, 83 Westhill, London, S.W.15. October 9, 1935.

Flectol. 565,231. Chemical preservative preparations for india-rubber articles. Monsanto Chemicals, Ltd., Victoria Station House, Victoria Street, London, S.W.1. December 19, 1935.

Cereclor. 563,117. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosive. Imperial Chemical Industries, Ltd., Imperial Chemical House, Millbank, London, S.W.1. September 25, 1935.

Noral. 562,563. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Northern Aluminium Co., Ltd., Bush House, Aldwych, London, W.C.2. August 29, 1935.

Plassitil. 565,542. All goods included in Class 1. Howards & Sons, Ltd., Uphall Works, Uphall Road, Ilford. January 6, 1936.

Mersikar. 565,775. Activated carbon for use in manufactures. Mersey Carbons, Ltd., 10 Liverpool Road, Sankey Bridges, Warrington. January 17, 1936.

Metrix. 565,745. Tar or tar preparations for use in manufactures. South Metropolitan Gas Co., 709 Old Kent Road, London, S.E.15. January 15, 1936.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

HERBERT GREEN AND CO., LTD., London, S.W., oil and petroleum refiners. (M., 31/10/36.) October 13, charge (created by the receiver as agent of the company), to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank; general charge. *£150,000. September 6, 1935.

Satisfactions

JOHNSON AND SONS, MANUFACTURING CHEMISTS, LTD., London, N.W. (M.S., 31/10/36.) Satisfaction October 21, £80,000, registered October 19, 1921.

County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

AYRES, G. W. (male), Fairleigh, Harston, Cambridge, manager of oil company. (C.C., 31/10/36.) £15 5s. 6d. September 21.

Bankruptcy Proceedings

WILLIAM ELLIS HART, Walker Street Chemical Works, Walker Street, Preston, Lancs., oil, colour and chemical merchant.—This debtor attended at the Sessions Hall, Preston, on October 23 for his public examination. The statement of affairs submitted showed liabilities of £1,674, with a deficiency of £1,551. Debtor said that he commenced trading on his own account in about 1922 at Winkley House, Preston, later removing to Walker Street. He attributed his failure to helping to maintain his parents over a number of years. The examination was adjourned.

Voluntary Liquidation

THE FORD SOAP AND CHEMICAL CO., LTD., 5 Bazaar Street, Salford.—The statutory meeting of creditors was held on October 21 at the offices of Charles Stone, Lawless and Co., solicitors, Manchester, when the statement of affairs showed ranking liabilities of £373 17s. 4d. In addition there were fully secured creditors for £38 19s. 7d. After allowing £36 16s. for preferential claims, the net assets were £79 6s. 4d., or a deficiency, so far as the creditors were concerned, of £294 11s. The issued capital of the company was £300, all fully paid, and as regarded the shareholders there was a deficiency of £524 11s. The company was registered in October, 1935, to carry on business as manufacturers of soap and soap powders. The fully secured creditors were the owners of certain machinery on the company's premises, which had been supplied under hire-purchase agreements. The landlord had distrained and was in possession. Tentative offers had been made for the business as a going concern and it was hoped that a sale would take place. It was decided that the voluntary liquidation of the company should be continued with Mr. H. S. Grant, accountant, Salford, as liquidator, with a committee of three of the creditors.

Company News

Stream-line Filters.—An interim of 7½ per cent. (first dividend) has been announced.

L. B. Holliday.—A final dividend of 2½ per cent. for the year ended June 30, 1936, has been announced.

Cross Bone Manure and Lime.—The accounts for the year ended June 30, 1936, after deducting expenses, bad debts, tax and debenture interest, and setting aside £889 for dpreciation, show a net profit of £3,893; adding £2,110 brought forward, this makes £6,003. The directors recommend that £1,000 be written off goodwill, £500 transferred to general reserve, and a dividend of 7 per cent. (5 per cent.) be paid, leaving £2,557 forward.

Canadian Eagle Oil.—The directors have declared on the first preference share capital a dividend of 4s. 2.4d. for each ten shares of 3 Canadian dollars each, payable in London on October 31.

Anglo-Iranian Oil Co.—The board has declared an interim dividend of 5 per cent., less tax, on the ordinary stock, payable on November 17 next. This is at the same rate as in the previous year, when interim dividends were resumed. The final payment for 1935 was 10 per cent.

Eastern Chemical.—The report for the year to March 31, 1936, states that the year's working resulted in profit of £1,088, after charging £1,770 for plant maintenance. No depreciation has been written off buildings and plant, as the directors consider that a depreciation reserve of £25,039 is adequate in view of the way plant has been maintained since the revaluation in 1929-30. (For the previous year there was a profit of £221). Meeting, 13 Fenchurch Avenue, E.C., November 4, at 3 p.m.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Canada.—An importer or commission merchant in Winnipeg desires to secure the representation of United Kingdom manufacturers of dyes for the dyeing and cleaning, leather and fur trades. (Ref. No. 386.)

Fiji.—A firm of indent agents at Suva wishes to obtain the representation of United Kingdom matufacturers of washing blue (½ oz. and ¾ oz. bags and 1 oz. square blue), paper bags and salt. (Ref. No. 390.)

New Companies Registered

British Pitch Producers, Ltd.—Registered on October 27 as a company limited by guarantee, without share capital. To enter into agreements with members for the delivery of pitch or products derived from pitch, including pitch coke, and to adopt an agreement with the Pitch Marketing Co., Ltd. as agents for the company relating to the disposal of pitch acquired from members; to deal in pitch or products, and to manufacture, mix, refine or otherwise prepare pitch and such products for market, etc. Subscribers:—Charles G. Vickers, 18 Austin Friars, E.C.2, and Conyers Surtees.

Carnegie Chemicals (Welwyn), Ltd., 14 Tewin Road, Welwyn Garden City.—Registered October 24. Nominal capital, £5,000. Manufacturing chemists, etc. Directors: Robt. B. Carnegie, Angus W. J. Carnegie and David M. B. Carnegie.

Icta, Ltd.—Registered October 26. Nominal capital, £1,000. Manufacturers of and dealers in tungsten, carbide, molybdenum and other like substances, metal and alloy makers, etc. Directors: Thos. J. Ball, 3 Albert Crescent, Lincoln, and Herbert Reay.

Protol Products, Ltd., Chantry, Theatre Street, Norwich.—Registered October 22. Nominal capital, £3,500. To acquire the business carried on by Kenneth W. Walker and Corbett J. C. Lee at 53-55 Surrey Street, Norwich, as Protol Products, including the registered trade mark Protol Stain Remover, and to carry on the business of chemical manufacturers, manufacturers and importers of and dealers in all kinds of chemical products, toilet preparations and grease and stain removers, printers, manufacturers of and dealers in bottles, labels, cases, cartons and containers, etc. Directors: Kenneth W. Walker, Geo. Dugdale, Kenneth M. Macgregor and Cedric M. Imlach.

Turner Mausden and Co., Ltd., 65 High Street, Staines.—Registered October 23. Nominal capital, £1,000. Manufacturers and merchants of chemical compounds and preparations, manufacturing chemists, drysalters and distillers, manufacturers of cosmetics, general engineers and founders, manufacturers and merchants of household and general cleaning appliances, brooms, brushes, etc. Directors: E. A. Baker and J. S. H. Drysdale.

United Phosphates of Egypt, Ltd., 62 London Wall, E.C.2.—Registered October 22. Nominal capital, £500,000. To acquire any mines, mining rights and metalliferous, mineral or fertiliser bearing lands in Egypt or elsewhere; to carry on any metallurgical, mineral or chemical operations, etc., and to adopt an agreement with E.P.S., Ltd. Directors: Preston K. Horner and Walter Broadbridge.

Books Received

Handbook of Chemistry and Physics. Edited by Charles D. Hodgman. Cleveland, Ohio, U.S.A.: Chemical Rubber Publishing Co. Pp. 2023. Six Dollars.

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General Secretary, B.A.C.
"EMPIRE HOUSE," 175, PICCADILLY, LONDON, W.1
'Phone: Regent 6611

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COPPER Vacuum Pan, Autoclaves, and Jacketted Pans, also Gravity Rolls. C. F. DAVIS, LTD., 60 Hatcham Road, London, S.E.15.

EDGE Runner Mill, with Cast Iron Pan and Two Runners, 30 ins. by 8 ins. wide, also Paint or Liquid Mixing Machine, about 10 gallons capacity. Box No. 1793, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

FOR SALE, Gardner nearly new Sifter and Blender, 100 lbs. capacity. Box No. 1800, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

FOR SALE, 12 in. Krupp Disintegrator, also Harrison Carter size "C" Type, in excellent condition. Box No. 1792, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

FOUR Steam Jacketted Cylindrical Mixers and Dryers, 8 ft. long, 3 ft. diameter, also U-shaped Steam Heated Drying and Mixing Machine, also similar type for gas heating. Box No. 1794, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

ONE Jacketted Steel Pan, Steam, conical bottom, 8 ft. diameter, by 9 ft. 6 ins. total depth, internal agitating gear, and bevel drive. One ditto, 9 ft. diam. by 8 ft. deep. Over 100—500-gallon 5/32 in. plate Welded Steel Storage Tanks, unused, as taken from maker's works, approximately 8 ft. by 4 ft. diam. Any connections, send us your requirements.
ENGINEERING STORES AND SERVICES, LTD., 46/48 Queen Charlotte Street, Queen Square, Bristol, 1.' Phone 22171/2 Bristol.

SIFTING and Dressing Machine with removable barrel; also Centrifugal type, excellent condition. Write Box No. 1799, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

THREE 26 in. Heavy Steel Plated Exhaust Fans, also one or two smaller. Box No. 1795, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

TUMBLING barrel type Mixer, mounted over Sifting Machine, with receiving box, all mounted in wood frame. Box No. 1801, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

TWO Griveau Mixers, wood bodies, with Sifters fitted under, and receiving drawers for sifted powder. Box No. 1802, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

TWO Heavy Type Werner Mixers, Water Jacketted, size of Pans 3 ft. by 2 ft. 9 ins. by 2 ft. 6 ins.; also a smaller capacity Machine. Box No. 1796, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.